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News Bulletin
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Ganga has higher proportion of antibacterial agents: study

CSIR-NEERI

20th April, 2019

'The isolated components hold great potential as an antibacterial pharmaceutical'

A study commissioned by the Union Water Resources Ministry to probe the "unique properties" of the Ganga found that the river water contains a significantly higher proportion of organisms with antibacterial properties. Other Indian rivers also contain these organisms but the Ganga — particularly in its upper Himalayan stretches — has more of them, the study suggests.

The study, *'Assessment of Water Quality and Sediment To Understand Special Properties of River Ganga,'* began in 2016 and was conducted by the Nagpur-based National Environmental Engineering and Research Institute (NEERI), a CSIR lab. The NEERI team was tasked with assessing the water quality for "radiological, microbiological and biological" parameters in the Bhagirathi (a feeder river of the Ganga) and the Ganga at 20 sampling stations. As part of the assessment, five pathogenic species of bacteria (Escherichia, Enterobacter, Salmonella, Shigella, Vibrio) were selected and isolated from the Ganga, Yamuna and the Narmada and their numbers compared with the bacteriophages present in the river water. Because bacteriophages are a kind of virus that kill bacteria, they are frequently found in proximity to each other. "In the river Ganga, the bacteriophages were detected to be approximately 3 times more in proportion than bacterial isolates," the study's authors wrote in the report's synopsis analysed by *The Hindu*. Though it isn't evident that there are bacteriophage species unique to the Ganga, the study suggests there are many more of them in the Ganga than in other rivers.

Thus, samples drawn from the Ganga contained almost 1,100 kinds of bacteriophage, and proportionally there were less than 200 species detected in the samples obtained from the Yamuna and the Narmada.

However, these antibacterial properties varied widely along the length of the river. For instance, the stretch from Gomukh to Tehri had 33% more bacteriophage isolates than from Mana to Haridwar, and Bijnor to Varanasi. In the stretch from Patna to Gangasagar, the bacteriophages were only 60% of that in the Gomukh to Tehri stretch.

That the Ganga may contain unique microbial life, which makes it relatively more resilient to putrefaction, was suggested by British colonial scientists about 200 years ago. "This study was commissioned to test these properties using the latest scientific techniques and knowledge," said Rajiv Ranjan Mishra, Director-General, National Mission for Clean Ganga.

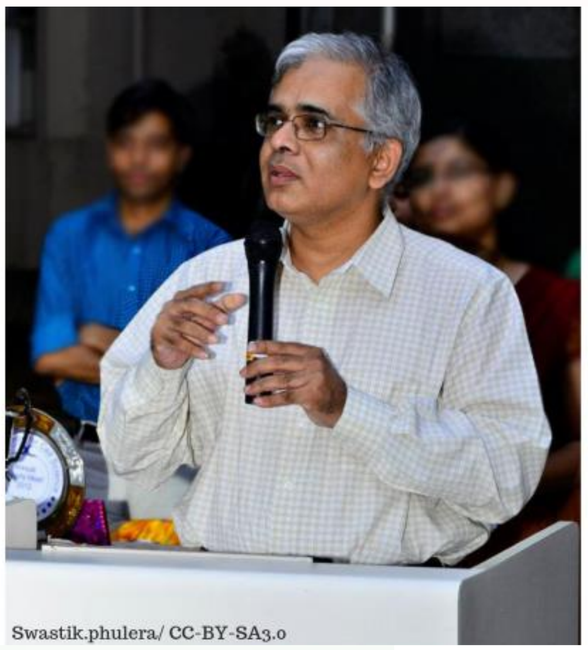
"The super-phage isolated from Ganga and decoded for its lysine gene and cloned to produce lysine protein at IIT Roorkee holds great potential as an antibacterial pharmaceutical," the report asserts.

Published in:
The Hindu

Director General of CSIR to visit NML Jamshedpur today, to inaugurate pilot plant

CSIR-NML

20th April, 2019



Swastik.phulera/ CC-BY-SA3.0

Shekhar C. Mande, director general of the Council of Scientific and Industrial Research (CSIR) and the Secretary of the Department of Scientific and Industrial Research (DSIR), Government of India will be visiting NML, Jamshedpur to inaugurate the Urban Ore Recycling Centre and site for Amorphous Electrical Steel (AES) Pilot Plant at Magnesium Plant Nildih. Mande will also visiting to various research lab and pilot plants of CSIR-NML, some of them are Coal Research Lab, Mineral Processing Pilot Plant, Foundry, Asia's second largest creep testing laboratory, NML Museum and Archive, Surface Engineering Lab and so on.

He will address to all the employees at CSIR-NML Auditorium. Mande is the highest authority of Thirty eight CSIR Laboratory succeeds all over India and he is known for his contributions in diverse areas of science. He is a leading structural and computational biologist and has more than 100 publications to his credit. Earlier he was the Director, National Centre for Cell Science (NCCS), Pune and has been involved in research on the structural characterization of Mycobacterium tuberculosis proteins and the computational analysis of genome-wide protein: protein interactions. Mande has several honours and awards to his credit. He is the fellow of all the three major science academies of India—the Indian National Science Academy (INSA), the National Academy of Sciences India (NASI), and the Indian Academy of Sciences (IAS). He received the prestigious Shanti Swarup Bhatnagar Prize for Biological Sciences in 2005.

Published in:

Avenue Mail

CSIR-NEERI

19th April, 2019

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THE TIMES OF INDIA

Unit already a subject of long-drawn litigation

TNN | Apr 19, 2019, 04.22 AM IST

Pune: The Jubilant Life Sciences plant at Nira-Nimbut in Purandar taluka is already at the centre of an environmental litigation, which was initiated a decade ago by the residents of Nimbut, Murum and Mirewadi villages along the Nira river.

The villagers had initially moved the Bombay high court, complaining about a large-scale contamination of river and underground water, and air and agricultural land pollution due to the discharge of improperly treated effluents.

In October 2013, the high court transferred the matter to the National Green Tribunal (NGT). On May 16, 2014, the tribunal's Pune bench directed the company to implement remedial measures, as suggested by the CSIR-NEERI, to decontaminate a 2km radius of the plant and to deposit Rs25 lakh with the district collector. The ongoing decontamination exercise has yet to be completed as the project proponent had suggested an alternative action plan for the same.

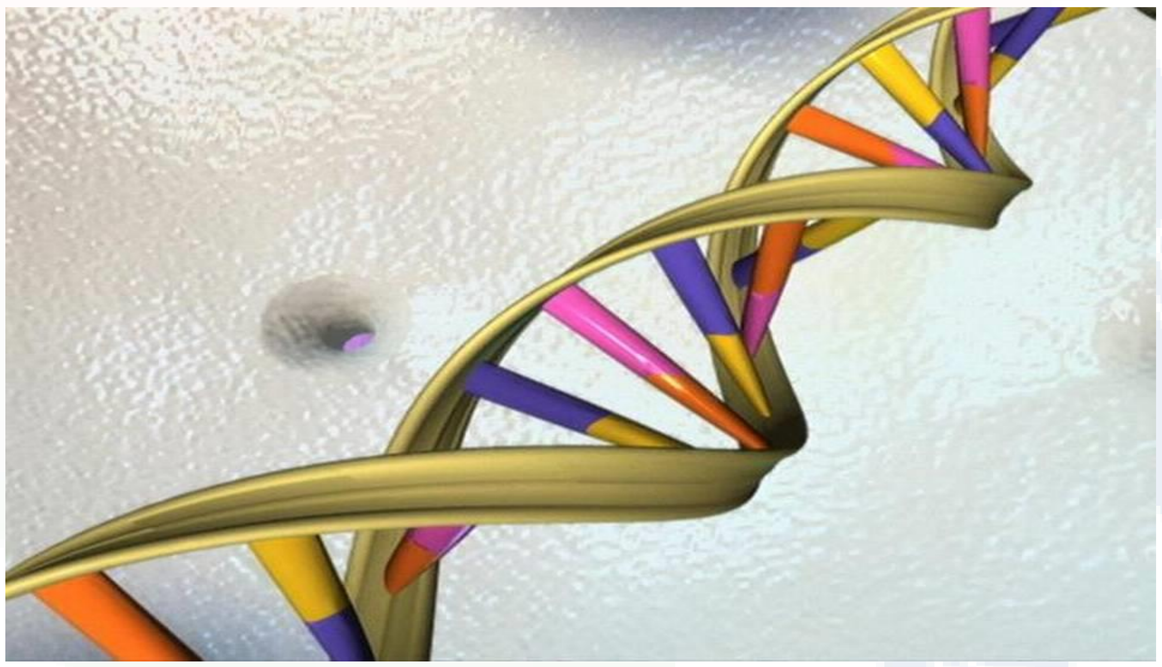
On August 10, 2017, the NGT allowed the project proponent to commence the remedial work as per the action plan and asked CSIR-NEERI to conduct certain pilot studies. On February 20 this year, NGT's principal bench in New Delhi constituted a three-member committee to monitor compliance and furnish a report by June 30. The matter has been posted for the next hearing on July 5.

Published in:
The Times Of India

Genome sequencing to map population diversity

CSIR-CCMB,IGIB

19th April, 2019



CSIR effort set to probe gene-disease link

In an indigenous genetic mapping effort, nearly 1,000 rural youth from the length and breadth of India will have their genomes sequenced by the Council of Scientific and Industrial Research (CSIR). The project aims at educating a generation of students on the "usefulness" of genomics. Globally, many countries have undertaken genome sequencing of a sample of their citizens to determine unique genetic traits, susceptibility (and resilience) to disease. This is the first time that such a large sample of Indians will be recruited for a detailed study. The project is an adjunct to a much larger government-led programme, still in the works, to sequence at least 10,000 Indian genomes. Typically, those recruited as part of genome-sample collections are representative of the country's population diversity. In this case, the bulk of them will be college students, both men and women, and pursuing degrees in the life sciences or biology. "This will not be an exercise to merely collect samples from people," said Vinod Scaria, a scientist at the Institute of Genomics and Integrative Biology (IGIB), a CSIR laboratory.

"We will be reaching out to a lot of collegians, educating them about genomics and putting a system in place that allows them to access information revealed by their genome," he said. Because genomics is largely confined to a rich urban demographic in India, this exercise, according to Dr. Scaria, would make such information ubiquitous even to villages. "Just as CT scans are now known across the country, we hope to do the same for genomes," he said.

Methodology

Genomes will be sequenced based on a blood sample and the scientists plan to hold at least 30 camps covering most States. Every person whose genomes are sequenced will be given a report. The participants would be told if they carry gene variants that make them less responsive to certain classes of medicines. For instance, having a certain gene makes some people less responsive to clopidogrel, a key drug that prevents strokes and heart attack.

"We wouldn't be sharing such information in the report. In some cases the correlation between disease and genes is weak. A person can request such information through their clinician because many disorders have single-gene causes but no cure or even a line of treatment. Ethics require such information to be shared only after appropriate counselling," said Dr. Scaria.

The project would involve the Hyderabad-based Centre for Cellular and Molecular Biology (CCMB) and cost ₹18 crore, with the sequencing to be done at the IGIB and the CCMB.

Anurag Agrawal, Director, IGIB, said that the project would prove India's capabilities at executing whole-genome sequencing. The human genome has about 3.2 billion base pairs and just 10 years ago cost about 10,000 dollars. Now prices have fallen to a tenth. "We can establish a baseline Indian population and ask novel questions. For instance, in developed countries diarrhoeal infections are rarer than in India. Do genes have a role? We can follow people over long periods and track health changes," he said. Ever since the human genome was first sequenced in 2003, it opened a fresh perspective on the link between disease and the unique genetic make-up of each individual. Nearly 10,000 diseases — including cystic fibrosis, thalassemia — are known to be the result of a single gene malfunctioning. While genes may render some insensitive to certain drugs, genome sequencing has shown that cancer too can be understood from the viewpoint of genetics, rather than being seen as a disease of certain organs.

Published in:
The Hindu

Indian tigers are highly stressed due to human disturbances

CSIR-CCMB

18th April, 2019

We have earlier found captive elephants showing compromised reproductive cycle due to stress," said Dr. Govindhaswamy Umapathy from the Laboratory for the Conservation of Endangered Species (LaCONES) at the Centre for Cellular and Molecular Biology (CSIR-CCMB), co-author of a **paper published** in the journal *PLOS ONE*.

Tigers in the Kanha reserve had the highest faecal glucocorticoids metabolites level (markers for stress)

Compared with 200-odd Amur tigers in Russian Far East, the Bengal tigers in three tiger reserves in India — Bandhavgarh, Kanha, Sariska — are about 20% more stressed, a study found. The Indo-Russian team measured the stress level by studying the glucocorticoids metabolites present in the faeces of tigers. "Increased stress level for prolonged periods will affect the immunity and fitness of tigers. Most importantly, elevated stress negatively impacts reproductive hormones which can lead to reduced fertility and reproductive failure.

Tigers in the Kanha reserve had the highest faecal glucocorticoids metabolites level (markers for stress) while tigers in the Bandhavgarh reserve had the lowest level and comparable with the Amur tigers of **Russia.**

"Though there is a variation in the concentration of glucocorticoids metabolites in tigers in the three reserves, there is no significant difference in the stress levels. The elevated stress in Bengal tigers might be due to anthropogenic disturbance," says Vinod Kumar, Technical Officer at CCMB and a co-author of the paper.

High population density

While the tiger reserves in India are smaller than in Russia, the anthropogenic disturbances are very high in Indian reserves.

Besides high anthropogenic stress, tigers in the three reserves experience higher **population** density compared with Amur tigers in Russia. At 11.33 tigers per 100 sq km, the density of tigers is many times higher in India compared with Ussuriisky reserve in Russia (0.15 tigers per 100 sq. km). "Anthropogenic disturbances and higher population density could be causing higher stress in Indian tigers," Dr. Umapathy says.

"A 2015 study by our team found that tigers reintroduced in Sariska reserve experienced high stress due to anthropogenic disturbances," Dr. Umapathy says. Besides high vehicular traffic, tigers in the Sariska reserve encounter herders, villagers who visit the forest for collecting wood and livestock grazing. As a result, the reproducing ability of Sariska tigers reduced.

Unlike Sariska, the Panna tiger reserve faces less anthropogenic disturbances. As a result, three of the five reintroduced tigresses in Panna reserve produced multiple litters successfully in four years, while in Sariska a tigress could successfully breed only once after four years.

Published in:
The Hindu

Workshop on chemistry of vaccine, immunology

CSIR-IMTech

17th April, 2019

An international workshop on the theme of 'Chemistry of Vaccine and Immunology' was organised at the Department of Chemistry, PU, wherein several academicians delivered talks on the topic.

Also, as a part of SPARC (Scheme for Promotion of Academic and Research Collaboration) visit at PU, Prof Nikolai Petrovsky delivered a talk entitled 'Intelligent Vaccine Design' at the IIT-Ropar and CSIR-IMTECH on Tuesday.

On April 12, Prof Petrovsky met the PU Vice-Chancellor and discussed about the establishment of an international vaccine discovery and development centre on the campus.

The discussion was based on a proposal submitted by Dr Deepak B Salunke from the Department of Chemistry.Assistant prof Rohit K Sharma, Department of Chemistry & Centre for Advanced Studies, PU, has been awarded the prestigious project from SPARC, an initiative of the Ministry of Human Resource and Development, in collaboration with Osaka University.

The objectives include the academic and research visits by Osaka University professors and students to the PU and vice-versa. — TNS

Published in:
Orissa Diary

Dr. B.R. Ambedkar Jayanti Celebration at CSIR-IMMT Bhubaneswar

CSIR-IMMT

15th April, 2019

Bhubaneswar: 128th Dr. B R Ambedkar Jayanti has been celebrated at CISR-Institute of Minerals and Materials Technology, Bhubaneswar with 400 participants, among them, 100 students from different Schools of Bhubaneswar were attended the function. Dr. A. K. Sahu, Chairman of. Dr. B R Ambedkar Jayanti celebration committee has given welcome address. Prof. S. Basu, Director of CSIR-IMMT, Bhubaneswar has given Inaugural address and Chief Guest of the function Prof. Sashmi Nayak, Ambedkar Chair Professor & Director, NISWASS, Bhubaneswar has addressed the gathering on Dr. B.R. Ambedkar and also motivated the school children by presenting study materials to them, donated by staff of this Institute . Chief Speaker, Dr. R. Rajendran, Professor of Dayananda Sagar College of Engineering & Ex-Head of Propulsion Division, NAL Bangalore has delivered the key note address on "Life history of Dr. B.R. Ambedkar and need for development of weaker section" and distributed prizes for the topers of the RRL Project U.P. School and winners of different competitions.

At the end vote of thanks has been given by Dr. Santosh Kumar Behera, Senior Scientist, convener of Dr. B R Ambedkar Jayanti celebration committee & General Secretary of SC/ST Employees Welfare Organization.

Published in:
Orissa Diary

CSIR-IMMT

15th April, 2019

■ ଆଇଏମଏମଟିର ପ୍ରତିଷ୍ଠା ଦିବସ

ଲିଥିୟମ ବ୍ୟାଟେରୀର ପୁନଃବ୍ୟବହାରର ବିକାଶ ହେବ

• ଭୁବନେଶ୍ୱର, ପିଏନଏସ

ଭାରତ ହେଉଛି ଦ୍ରୁତ ଅଭିବୃଦ୍ଧିଶାଳୀ ରାଷ୍ଟ୍ର। ଦ୍ୱିତୀୟ ସର୍ବାଧିକ ୧୨୦ କୋଟି ଲୋକଙ୍କର ବିଭିନ୍ନ ଆବଶ୍ୟକତା ଦେଶକୁ ଏକ ବଡ ବଜାରର ମାନ୍ୟତା ପ୍ରଦାନ କରୁଛି। ଇଲେକ୍ଟ୍ରୋନିକ୍ସ ଯନ୍ତ୍ରପାତି ଆମଦାନୀରେ ମଧ୍ୟ ଭାରତ ଏକ ବଡ ବଜାର। ବିଦେଶରୁ ପ୍ରତିବର୍ଷ ବିଲିୟନ ଡଲାରର ଯନ୍ତ୍ରପାତି ଆମଦାନୀ ହୋଇଥାଏ। ଇଲେକ୍ଟ୍ରୋନିକ୍ସ ସମାଗ୍ରାରେ ବ୍ୟବହୃତ ବ୍ୟାଟେରିକୁ ପୁନଚକ୍ରୀକରଣ ବା ପୁନଃ ବ୍ୟବହାର କରିବା ଲାଗି ଆଇଏମଏମଟି ଗବେଷଣା କରୁଛି। ଏହି ଗବେଷଣା ଶେଷରେ ଆଇଏମଏମଟି ଲିଥିୟମ ଯୁକ୍ତ ବ୍ୟାଟେରୀକୁ ପୁନଃବ୍ୟବହାର କରିବାର ଜ୍ଞାନକୌଶଳ ହାସଲ କରିବ। ଯାହା ଫଳରେ ବିଦେଶରୁ ଆମଦାନୀ ହେଉଥିବା ବ୍ୟାଟେରୀ ଭାରତରେ ତିଆରି ହେବା ସହିତ ଭାରତରେ ବ୍ୟାଟେରୀ ଚାଳିତ ଜାନ ବୋଲି ଆଇଏମଏମଟିର ନିର୍ଦ୍ଦେଶକ ଶୁଦ୍ଧସତ୍ୱ ବସୁ ପ୍ରତିଷ୍ଠାନର ୫୬ତମ ପ୍ରତିଷ୍ଠା ଦିବସ ସମାରୋହରେ ମତବ୍ୟକ୍ତ କରିଥିଲେ।

କ୍ୟାମ୍ପସ ପରିସରରେ ଶ୍ରୀ ବସୁଙ୍କ ଅଧ୍ୟକ୍ଷତାରେ ଆୟୋଜିତ କାର୍ଯ୍ୟକ୍ରମରେ ମୁଖ୍ୟ ଅତିଥିଭାବେ ଯୋଗଦେଇ ଏଆରସିଆଇର ନିର୍ଦ୍ଦେଶକ ଡ. ଜି ପଦ୍ମନାଭମ ଦିକ୍ଷାନ୍ତ ଭାଷଣ ଦେବା ସହିତ କହିଥିଲେ ବିକାଶ ଓ ଗବେଷଣା ପରସ୍ପର ମଧ୍ୟରେ ଅଙ୍ଗାଙ୍ଗୀଭାବେ ଜଡିତ। ଦେଶ ବିକାଶରେ ଗବେଷଣାଗତ ଜ୍ଞାନକୌଶଳର ଅବଶ୍ୟକତାକୁ ଆଇଏମଏମଟି ଭଳି ପ୍ରତିଷ୍ଠାନ ପୂରଣ କରିପାରିଛନ୍ତି ବୋଲି ଡ. ପଦ୍ମନାଭମ କହିଥିଲେ। ପ୍ରତିଷ୍ଠାଦିବସ ସମାରୋହ ଅବସରରେ ଆଇଆଇଟି ଭୁବନେଶ୍ୱର ଏବଂ ଆଇଏମଏମଟି ମଧ୍ୟରେ ବୁଝାମଣାପତ୍ର ସ୍ୱାକ୍ଷରିତ ହୋଇଥିଲା। ସମ୍ମାନିତ ଅତିଥିଭାବେ ଜିନ୍ଦଲ ଷ୍ଟିଲର ସିଏସଆଇଆର ମୁଖ୍ୟ ମନିଷ ଖରବନ୍ଦା ଉପସ୍ଥିତ ଥିବା ବେଳେ ଆଇଏମଏମଟି ମୁଖ୍ୟ ବୈଜ୍ଞାନିକ ସନ୍ତୋଷ କୁମାର ମିଶ୍ର ଧନ୍ୟବାଦ ଅର୍ପଣ କରିଥିଲେ।

Published in:
Pragativadi

Supporting startup ecosystem is the way to go

CSIR-CCMB

14th April, 2019

CSIR earmarks ₹400 crore as innovation fund

The Council of Scientific and Industrial Research (CSIR) has set aside innovation fund of over ₹400 crore, which would be utilised to support the startup ecosystem. CSIR Director General Shekhar C. Mande said the fund would be released in a few months. Speaking on the sidelines of a press conference held on the occasion of one-year anniversary of Atal Incubation Centre-Centre for Cellular and Molecular Biology (AIC-CCMB) here on Saturday, he said no such fund was allocated earlier for startups and innovations were supported by them on case-by-case basis.

"But now, we are taking a definitive step to promote innovations, especially those that arise out of CSIR labs," Dr. Shekhar said.

Recalling his interaction with CCMB students, the CSIR Director General said they asked him about a range of job opportunities that are available for Ph.D-holders. While earlier, one had to either pursue postdoctoral research or take up a job in academics after Ph.D, now he/she has major opportunities in entrepreneurship. He added that one of the powerful ways to create jobs was startups.

In one year of the AIC-CCMB, eight startups were incubated, which work on diagnostics, food, pharmaceuticals, and drug discovery.

"Many of us scientists work at a primitive level of technology development, which is quantified in terms of Technology Readiness Levels (TRL). Typically, in labs like ours, we work with TRL 1,2,3 and what industry prefers us to deliver is TRL 9. The industries will not come to us until we have TRL 9,"

Dr. Mande said at a panel discussion on 'Overcoming apprehensions of life sciences industries in institutional innovations'. He added that one of the powerful ways to fill the gap was to promote startups.

Other speakers at the panel discussion gave suggestions to entrepreneurs on what they can do if they are working on an idea. Chairman and managing director of Bharat Biotech Krishna Ella said science and technology constitutes only 10% of business, and emphasised that the understanding regulatory work was important. He urged the younger generation to work towards getting India recognised as an innovative country.

Ishita Agarwal, manager, Atal Incubation Mission, NITI Aayog, A.V. Rao, founder, chairman and managing director of Avra Laboratories, Rakesh Mishra, Director of CSIR-CCMB, participated in the panel discussion.

Published in:
The Hindu

What drives tiger dispersal

CSIR-CCMB

13th April, 2019

Terrain affects dispersal in different ways in the Western Ghats and central India

Tigers in India traverse long distances to find mates and new territories. But the movement depends on roughness of the terrain and human disturbance in the area. The terrain affects tiger dispersal differently in the Western Ghats and central India, two strongholds of wild tiger populations in the country, finds a new study. The central Indian landscape is highly fragmented with high densities of people, while the Western Ghats has lesser human disturbance and is home to the world's largest contiguous tiger population. A study in 2017 by a team including Anuradha Reddy (of Hyderabad's CSIR-Centre for Cellular and Molecular Biology) revealed that roughness of terrain and human footprint drove tiger gene flow in central India: tigers moved across ridges and rough topography to avoid the presence of people. Do similar landscape features drive tiger gene flow in the Ghats?

Varied samples

Another team including Dr. Reddy studied this across 30,000 sq km in the Western Ghats in Kerala, Karnataka and Tamil Nadu. They collected tiger faeces in forests including Bhadra Tiger Reserve and Nilgiri Biosphere Reserve, and used forensic samples that came to CSIR-CCMB between 2011 and 2015 to obtain genetic data of 115 individual tigers. They complemented this with overlays of land cover and land use categories, using maps showing terrain, road networks, developed areas (reflecting human disturbance) and historical maps (from the 1960s, to see how vegetation cover changed over the decades).

Role of gene flow

Though the team did not find strong correlations between current genetic structure and historical landscape in the Ghats, comparing the data with the team's earlier study in central India (after standardising the methods for comparisons) revealed an interesting pattern — the relationship between terrain and gene flow is "inverted" in both regions. While gene flow correlated with rough terrain in central India, it was linked with smooth forest terrain containing minimal human disturbance in the Ghats, finds the team's study published in *Animal Conservation*.

This pattern is mainly due to differing levels of human disturbance, Dr. Reddy said in an email. While Central India has more fragmented forests and higher human disturbance, the Ghats have relatively larger, connected forest patches and lesser human disturbance, facilitating tiger movement across lower and smoother areas, she added.

Published in:
The Hindu

CSIR-NEERI

12th April, 2019

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THE TIMES OF INDIA

Close polluting units along Yamuna, orders CPCB

TNN | Apr 12, 2019, 06.32 AM IST

NEW DELHI: The Central Pollution Control Board (CPCB) has asked the Haryana State Pollution Control Board (HSPCB) to identify the non-complying industrial units at Yamuna Nagar, Panipat and Kundli and shut them down to stop pollution, particularly in the Delhi stretch of Yamuna.

According to the apex pollution body, while conducting a study along with CSIR-National Environmental Engineering Research Institute, the CPCB observed that untreated waste water of various industrial units in these three areas were being dumped in the river.

"In compliance with the direction of the Yamuna Pollution Monitoring Committee appointed by the National Green Tribunal, a team of officials from CPCB and CSIR-NEERI monitored water quality of Yamuna at Wazirabad, Palla Village, Sonepat, Panipat and Yamuna Nagar and drains (Ditch drain, Panipat drain, Drain No. 8 and Drain No. 2) on December 24, 26 and 27, 2018, to assess and identify the sources of pollution in Yamuna," CPCB chairman SPS Parihar wrote in a letter to Haryana SPCB chairman.

"During the monitoring, the team observed that Yamuna Nagar drain, Panipat drain and Drain no. 2/6/8 carry untreated waste water of various units located at Yamuna Nagar, Panipat and Kundli," the letter added.

Published in:
The Times Of India

Awareness cum training camps on high value crops held

CSIR-IHBT 11th April, 2019

IMPHAL, Apr 12: Scientists of CSIR-Institute of Himalayan Bioresource Technology, Palampur, Himachal Pradesh, a constituents laboratory of Council of Scientific and Industrial Research (CSIR) visited different districts of Manipur from April 5-8 in order to explore the possibilities for cultivation of aromatic crops in the State and on introduction of low chilling varieties of apple.

Demonstration plots of low chilling varieties of apple has already been established by CSIR-IHBT on pilot scale at different locations in collaboration with North Eastern Region Community Resource Management Project (NERCORMP), Ukhrul, Manipur to see the suitability of variety and locations.

These varieties have low chilling requirement and can be grown in lower elevations. Scientists had visited all the demonstration plots of apple plantations and imparted trainings to the farmers for adopting different agropractices of apple cultivation during their visit.

A one day awareness cum exposure programme on cultivation and post harvest management of aromatic crop was also conducted on April 7 at Makhan village of Kangpokpi district. Dr Rakesh Kumar, Principal Scientist and Dr Kiran Singh Saini, Senior Technical Officer addressed the farmers about the aromatic and industrial crops that are suitable for cultivation in the region.

Organic cultivation practices of aromatic crops viz., damask rose, wild marigold, palmarosa and lemongrass etc., were emphasized for fetching higher price in the local as well as international market.

Dr Kumar informed the gathering that CSIR has initiated a mission program in which more than 5,500 hectares area will be brought under aromatic crops in India by March 31, 2020 by different CSIR labs and these crops has huge potential in the world market as the essential oils obtained from these crops are used in perfumery, fragrance and other industries.

Dr Sanjay Kumar, Director, CSIR-IHBT told the correspondent that essential oils market, in terms of value, is projected to reach around USD 11.19 bn by 2022, at a CAGR of 8.83% from 2017 to 2022. U.S., China and India are the major producers, consumer and exporter of essential oil in the world.

Dr Sanjay Kumar is of the apprehension CSIR-IHBT is along with NERCORMP Ukhrul is experimenting in introduction of low chilling varieties in different locations of Manipur.

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