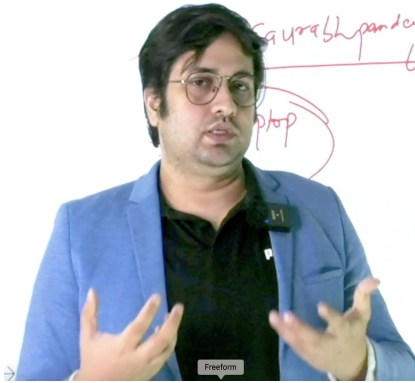
Topics - MINDS MAPS included (Daily current affairs 3rd & 2nd March 2025

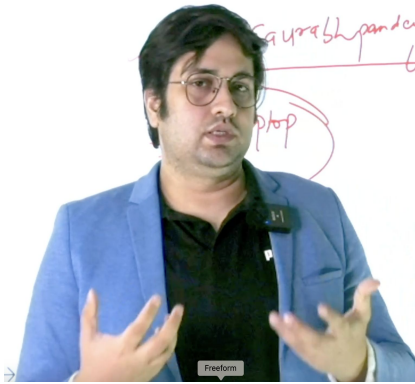
- Blue Ghost
- Discovery of New Jumping Spider Species in Kerala.
- What is Gravitational Lensing?
- What is a Planetary Parade?
- Three Language Formula & NEP
- The Advocates (Amendment) Bill, 2025:
- Maple Syrup Urine Disease (MSUD)
- DNA Methylation:
- PM2.5 Pollution in Northern India:
- Anemonefish and Their Symbiotic Relationship with Sea Anemones
- High Selenium Levels



By saurabh Pandey

THE HINDU

- DNA Methylation:
- PM2.5 Pollution in Northern India:
- Anemonefish and Their Symbiotic Relationship with Sea Anemones
- High Selenium Levels
- Mains



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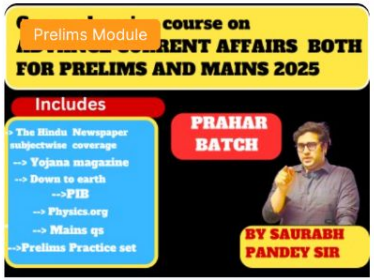

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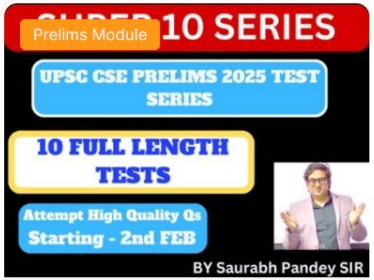

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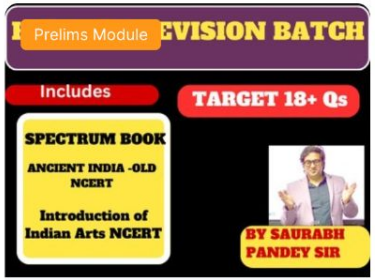

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In a first, private spacecraft lands upright on moon

Associated Press
WASHINGTON

A U.S. company successfully landed its spacecraft on the moon on Sunday, marking only the second private mission to achieve the milestone – and the first to do so upright.

Firefly Aerospace's Blue Ghost Mission 1 touched down shortly after 3.34 a.m. U.S. Eastern Time (0204 IST) near Mons Latreille, a volcanic formation in Mare Crisium on the moon's northeastern near side.

"Y'all stuck the landing, we're on the moon," an engineer at mission control in Austin, Texas, called out as the team erupted in cheers.

CEO Jason Kim confirmed that the spacecraft was "stable and upright" – in contrast to the first private landing last February, which came down sideways.

"We're on the Moon!" Nicky Fox, associate administrator for NASA's Science Mission Directorate, rejoiced.

The first image from the lander revealed the rocky, pockmarked terrain it had to autonomously navigate in order to select its touchdown spot, having slowed down from thousands of miles per hour to just two mph.

Nicknamed "Ghost Riders in the Sky," the mission is part of a NASA-industry partnership aimed at reducing costs and supporting Artemis, the programme designed to return astronauts to the moon.

The mission is aimed at reducing costs and supporting Artemis, the programme designed to return astronauts to the moon. AP

Size of a hippopotamus

The golden lander, about the size of a hippopotamus, launched on January 15 on a SpaceX Falcon 9 rocket, capturing stunning footage of the earth and the moon along its 2.8 million mile journey.

It shared a ride with a Japanese company's lander set to attempt a landing in May.

Blue Ghost carries 10 instruments, including a lunar soil analyser, a radiation-tolerant computer and an experiment testing the feasibility of using the existing global satellite navigation system to navigate the Moon.

Designed to operate for a full lunar day (14 earth days), Blue Ghost is expected to capture high-definition imagery of a total eclipse on March 14, when the earth blocks the sun from the moon's horizon.

On March 16, it will record a lunar sunset, offering insights into how dust levitates above the surface under solar influence – creating the mysterious lunar horizon glow first documented by Apollo astronaut Eugene Cernan.

Hopping drone

Blue Ghost's arrival will be followed on March 6 by fellow Texas company Intuitive Machines' IM-2 mission, featuring its lander Athena.

In February 2024, Intuitive Machines became the first private company to achieve a soft lunar landing – also the first U.S. landing since the crewed Apollo 17 mission of 1972.

However, the success was tempered by a mishap: the lander came down too fast and tipped over on impact, leaving it unable to generate enough solar power and cutting the mission short.

This time, the company says it has made key improvements to the hexagonal-shaped lander, which has a taller, slimmer profile than Blue Ghost, and is around the height of an adult giraffe.

Athena launched on Wednesday aboard a SpaceX rocket, taking a more direct route toward Mons Mouton – the southernmost lunar landing site ever attempted.

Until Intuitive Machines' first successful mission, only five national space agencies had accomplished this feat: the Soviet Union, the United States, China, India and Japan, in that order. Now, the U.S. is working to make private lunar missions routine through NASA's $2.6 billion Commercial Lunar Payload Services programme.

Topic → Blue Ghost

- Firefly Aerospace etched its name in the annals of space history by triumphantly landing its spacecraft, Blue Ghost Mission 1, on the moon.
- This landmark event is not just a mere milestone; it symbolizes the emergence of private enterprises in the realm of space exploration.
- Blue Ghost elegantly touched down near Mons Latreille, a striking volcanic formation nestled in Mare Crisium, at the precise moment of 3:34 a.m. U.S. Eastern Time (0204 IST).
- The Blue Ghost lander, comparable in size to a hippopotamus, launched on January 15 aboard a SpaceX Falcon 9 rocket.
- Blue Ghost is poised to analyze lunar soil, assess radiation-tolerant computing, and explore the feasibility of utilizing existing global satellite navigation systems for lunar navigation.

-
- Building upon Blue Ghost’s success, another Texas-based company, Intuitive Machines, is gearing up to launch its IM-2 mission featuring the lander Athena on March 6.
- The U.S. is diligently working to make private lunar missions a regular occurrence through NASA’s $2.6 billion Commercial Lunar Payload Services program. This initiative aims to cultivate collaboration between governmental and private sectors, paving the way for future lunar exploration and eventual human missions

Research team discovers two more species of jumping spiders in wildlife sanctuary in Kerala

Sarath Babu George
THIRUVANANTHAPURAM

A collaborative research involving the University of Kerala reported the discovery of two new species of jumping spiders belonging to the genus *Epidelaxia* from the Shendurney Wildlife Sanctuary in the State. This was the first time the genus had been recorded from India, extending its known range from Sri Lanka to other parts of the subcontinent.

The research team behind the find included Asima A. and G. Prasad from the Department of Zoology of the University of Kerala; John T.D. Caleb from Saveetha Medical College & Hospitals, Chennai; and Mathew M.J. from the Centre for Arachnology Research at Bharata Mata College, Kochi. Their work, published in the February issue of *Zootaxa*, a peer-reviewed journal, not only added two new species to the region's checklist but also shed light on the rich biodiversity of the Western Ghats.

The two new species, *Epidelaxia falciformis sp. nov.* and *Epidelaxia palustris sp. nov.*, were discovered during field expeditions to Kulathupuzha in Kollam in December 2022 and April 2023.

Epidelaxia falciformis sp. nov. and *Epidelaxia palustris sp. nov.* from the Shendurney Wildlife Sanctuary. SPECIAL ARRANGEMENT

These are distinctively characterised by their striking physical features, which include a prominent yellow triangular-shaped mark on the prosoma (the front part of the body) of females and unique traits of the copulatory organs in both males and females. Males of *E. falciformis* have a brown carapace with a yellow-brown stripe, while males of *E. palustris* feature a pale brown band along the side of their bodies. The females exhibit similar colouration, with the added feature of white orbital setae around their eyes.

Size variation

The researchers added that the species varied slightly in size, with *E. falciformis* measuring 4.39 mm while the *E. palustris* measured 4.57 mm (males) and 3.69 mm (females). These spiders were described as highly adapted to their environment, inhabiting the dense foliage of the Western Ghats. The genus was previously considered endemic to Sri Lanka.

Topic → Discovery of New Jumping Spider Species in Kerala

🕷️ Discovery of New Species: Two new species of jumping spiders, Epidelaxia falciformis sp. nov. and Epidelaxia palustris sp. nov., were discovered in the Shendurney Wildlife Sanctuary, Kerala.

🌍 Geographical Range Expansion: This marks the first record of the genus Epidelaxia in India, expanding its known range from Sri Lanka to the Indian subcontinent.

👩‍🔬 Research Team: The research was conducted by a collaborative team from the University of Kerala, Saveetha Medical College, and Bharata Mata College, with findings published in Zootaxa.

📅 Field Expeditions: The new species were discovered during field expeditions in Kulathupuzha, conducted in December 2022 and April 2023.

🎨 Distinct Physical Features: The spiders are characterized by a yellow triangular mark on females and unique copulatory organ traits in both sexes, with males displaying distinct coloration patterns.

📏 Size Variation: E. falciformis measures 4.39 mm, while E. palustris measures 4.57 mm (males) and 3.69 mm (females), indicating slight size variation.

🌿 Habitat Adaptation: These species are highly adapted to the dense foliage of the Western Ghats, showcasing the region's rich biodiversity.

Renowned artist Himmat Shah dies of heart attack at 92

Press Trust of India
NEW DELHI

HIMMAT SHAH
(1933 - 2025)

Renowned artist and sculptor Himmat Shah died at Jaipur's Shalby Hospital after a heart attack on Sunday, his close friend Himanshu Jangid told *PTI*. Mr. Shah was 92.

"Although he was not feeling well for the last one week, he was actively working in his studio. On Monday, he had a heart attack following which he passed away," Mr. Jangid said.

He is survived by two sisters, who will take part in his last rites on Monday in Jaipur.

Born in Gujarat's Lothal in 1933, Mr. Shah was inadvertently introduced to terracotta art and other objects from the Indus Valley Civilisation.

He was later sent to Gharshala, a school affiliated to Dakshinamurty, where he studied under artist-educator Jagubhai Shah before joining the J.J. School of Art in Bombay, and moving on to Baroda on a government scholarship from 1956 to 1960.

In Baroda, he was influenced by N.S. Bendre and K.G. Subramanyan. Later in 1967, he received a French government scholarship to study etching under S.W. Hayeter and Krishna Reddy at Atelier 17, Paris.

Mr. Shah shared his days at the Faculty of Fine Arts in Baroda with one of his contemporaries and renowned painter Gulammohammed Sheikh.

Remembering Mr. Shah as an "ebullient and jovial" person, Mr. Sheikh said he developed a "highly individualised approach" to sculpture, "...changing the idea of making a human head in multiple ways with ingenious dexterity and creative spirit".

Person In News

- Renowned artist and sculptor Himmat Shah died.
- Born in Gujarat’s Lothal in 1933, Mr. Shah was inadvertently introduced to terracotta art and other objects from the Indus Valley Civilisation.

Euclid space telescope discovers new 'Einstein ring' in nearby galaxy

All Einstein rings have great scientific value, but Altieri's ring is extra special because it has been observed in a well-studied nearby galaxy, NGC 6505. Only five other gravitational lenses at similar distances have been found so far. Altieri's ring is composed of the distorted images of another galaxy 4.5 billion lightyears away

Smriti Mahajan

In the middle of this image, the fuzzy-looking bulb of light in a warm shade of yellow extends around a small bright spot, nestled within a thin light circle that appears to be drawn closely around it. The circle is an Einstein ring. ESA/EUCLID/EUCLID CONSORTIUM/NASA

THE GIST

Recently the Euclid space mission spotted an Einstein ring in the galaxy NGC 6505. An astronomer named Bruno Altieri first noticed this Einstein ring in September 2023 in a blurry image captured by Euclid, which ESA had launched only two months earlier

Einstein predicted that light will not travel on a straight path in the vicinity of massive objects. A massive object in the foreground of a light source acts as a gravitational lens, distorting and amplifying light in the same way a magnifying glass distorts the path of light

Euclid began to scan the sky formally on February 14, 2024, and is expected to discover 100,000 new gravitational lenses. Its chances of discovering lenses so close to the earth, however, remain slim because of the smaller volume of the universe available to look in

More than a century ago, Albert Einstein predicted that massive objects like large galaxies and clusters of galaxies act like giant lenses in space by bending light from distant objects.

As seen from an observer on the earth, a rare alignment of a background object with such a lens in the foreground can lead to a visual spectacle. Because of the lensing, the observer sees arc-like structures skirt the foreground lens. Sometimes these arcs are arranged in a circular pattern, which is called an Einstein ring.

Altieri's ring

Recently, the Euclid space mission of the European Space Agency (ESA) spotted an Einstein ring in the galaxy NGC 6505, just 590 million lightyears from the earth. This may sound like a long distance, but on the astronomical scale, the galaxy is veritably in our cosmic backyard.

An astronomer named Bruno Altieri first noticed this Einstein ring in September 2023 in a blurry image captured by Euclid, which ESA had launched only two months earlier.

The image was unfocused by design because in the initial days of the mission, scientists were taking data to test if all of Euclid's systems were functioning properly. Subsequent images of the galaxy yielded focused images, using which scientists confirmed the presence of the ring. It has since been nicknamed Altieri's ring in honour of the scientist who stumbled upon it.

A quirk of the light

Einstein predicted that light will not travel on a straight path when moving in the vicinity of massive objects. He argued that a large object distorts spacetime – the fabric of space and time around it – just like the curvature of a hammock is determined by the mass of the person sitting in it.

This idea forms the basis of Einstein's famous general theory of relativity, which the American physicist John Wheeler summed up perfectly in the following words: "matter tells spacetime how to curve, and curved spacetime tells matter how to move."

The massive object in the foreground, called a gravitational lens, distorts and amplifies the light coming from background sources in the same way a magnifying glass distorts the path of light scattered by a background object, like small lettering on a piece of paper.

That said, a gravitational lens is not as perfectly shaped as a magnifying glass and may produce multiple images of the background object. The number of images depends on the relative distance between the lens and the observer, between the lens and the background object, and the latter's alignment with the lens.

This quirky cosmic phenomenon is called strong gravitational lensing. The multiple images can appear in a variety of configurations around the lens and can assume slightly different shapes and sizes depending on the distribution of matter in it.

An Einstein ring is a special case of strong gravitational lensing. Astronomers discovered the first Einstein ring in 1998, more than 80 years after Einstein predicted their existence. An Einstein ring is created when a gravitational lens distorts light coming from a distant background object, like a star or a galaxy, in such a way that the multiple images created in the foreground form a circular pattern around the lens. This requires a near-perfect alignment between the distant object, the lens, and the observer.

A new set of eyes

All Einstein rings have great scientific value, but Altieri's ring is extra-special because scientists have observed it in a well studied nearby galaxy, NGC 6505. Scientists have found only five other gravitational lenses at similar distances so far. Altieri's ring is composed of the distorted images of another galaxy 4.5 billion lightyears away.

Since NGC 6505 has been known to astronomers since the 19th century, the

An Einstein ring is a case of strong gravitational lensing. Astronomers discovered the first ring in 1998, 80 years after Einstein predicted their existence

ring's discovery shows how turning new telescopes to old targets can still yield valuable new knowledge.

The study of Einstein rings can also provide new insights into the universe's expansion and provide opportunities to test the theory of general relativity and investigate distant objects that are otherwise obscured.

They can also help astronomers understand the nature of dark matter, a mysterious form of matter that comprises around 30% of the total mass-energy budget of the universe yet remains undetected because it doesn't interact with the normal matter of which you and I are made. The presence of dark matter can only be inferred from the gravitational effect it has on matter surrounding it – or by bending light around itself.

One of a kind, probably

Following the discovery of Altieri's ring in September 2023, Euclid scientists further investigated this system for more insights using other telescopes. This way, for example, data from the Keck Cosmic Web Imager (KCWI) obtained in March 2024 confirmed the lensed nature of the images.

Together with data from the archives of the Canada-France-Hawaii Telescope and the Dark Energy Spectroscopic Instrument, scientists also confirmed the total mass of stars and the distance to NGC 6505 and the lensed galaxy. They found that the latter is an old galaxy no longer forming stars.

While the discovery of Altieri's ring so early in Euclid's life is exciting for the mission, its scientists sounded caution in a paper published in *Astronomy & Astrophysics* on February 10: "... the exceptional nature of Altieri's lens means it is unlikely that Euclid will find another lens" closer than around 680 million light-years "with a ring as bright as that observed here."

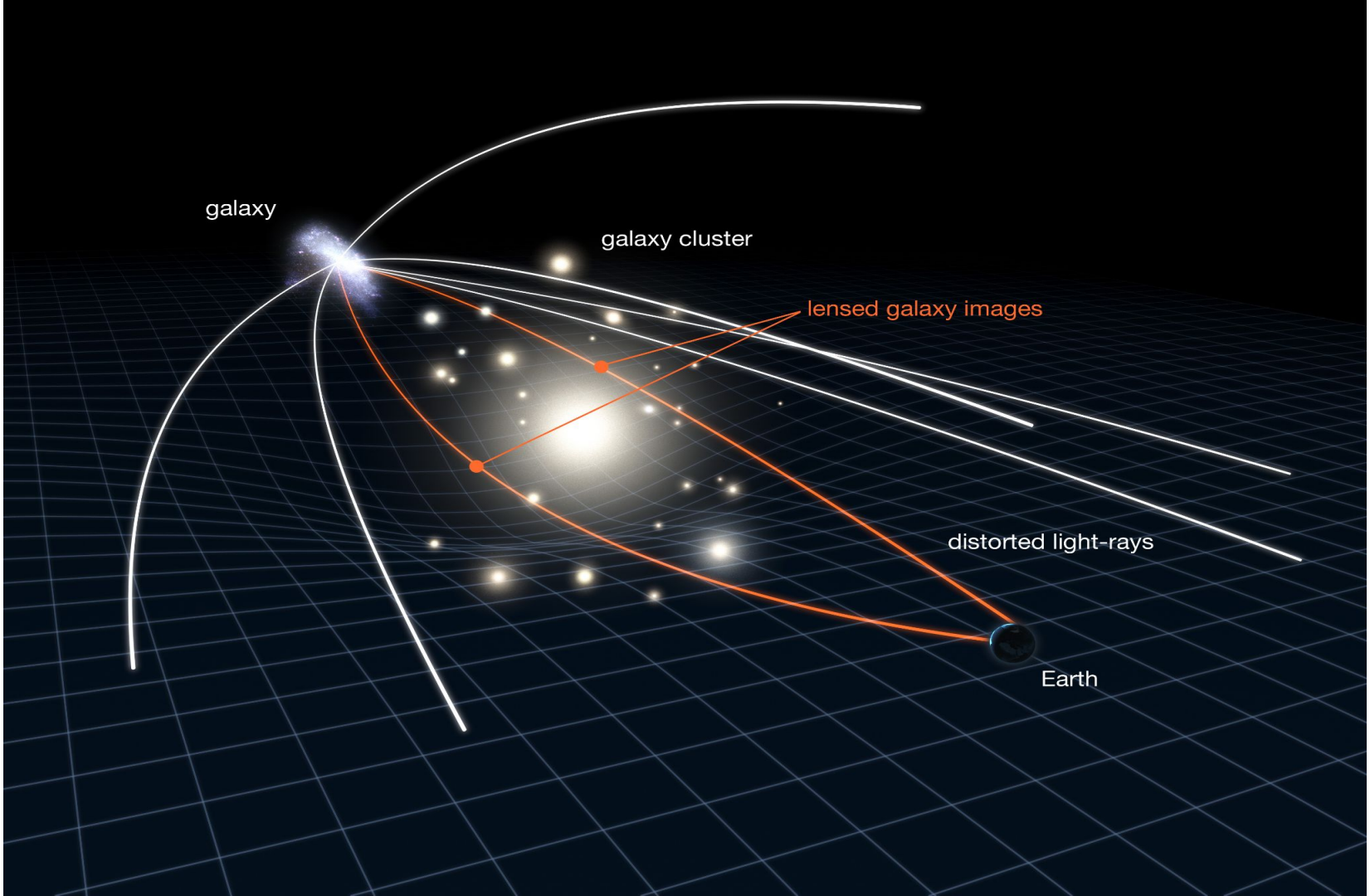
Euclid began to scan the sky formally on February 14, 2024, and is expected to discover 100,000 new gravitational lenses in the universe. Its chances of discovering lenses so close to the earth, however, remain slim because of the smaller volume of the universe available to look in.

This said, the discovery of Altieri's ring highlights Euclid's potential and the role it can play in advancing our understanding of dark matter.

(Smriti Mahajan is an astronomer and science communicator promoting STEM education through astronomy. mahajan.smriti@gmail.com)

Topic → What is Gravitational Lensing?

- Gravitational lensing is a captivating phenomenon that occurs when a massive object—such as a galaxy or a cluster of galaxies—creates a gravitational field strong enough to distort the light from objects located behind it.
- This effect is rooted deeply in the fabric of space-time as described by Einstein's general theory of relativity.
- It acts as a cosmic magnifying glass, allowing astronomers to observe distant galaxies that would otherwise be invisible.


galaxy
galaxy cluster
lensed galaxy images
distorted light-rays
Earth

Key Characteristics:

- Light from a background galaxy is bent around the massive foreground object.
- The light can form multiple images, arcs, or even rings known as *Einstein rings* when viewed from Earth.
- This phenomenon can help detect and analyze both visible and dark matter.

The Mechanics Behind Gravitational Lensing

Gravitational lensing can be classified into three main types: strong, weak, and microlensing. Each type provides unique insights into the universe's structure.

Strong Lensing:

- Occurs when there is a significant mass concentration.
- Produces multiple images and Einstein rings.

Weak Lensing:

- Results in subtle distortions of background galaxies.
- Used to map dark matter distribution in clusters.

Microlensing:

- Involves smaller masses, like individual stars.
- Temporarily magnifies the light of a background star, allowing for the discovery of distant celestial bodies.

- Recently, the Euclid space mission of the European Space Agency (ESA) spotted an Einstein ring in the galaxy NGC 6505, just 590 million light years from the earth.
- This may sound like a long distance, but on the astronomical scale, the galaxy is veritably in our cosmic backyard.
- An astronomer named Bruno Altieri first noticed this Einstein ring in September 2023 in a blurry image captured by Euclid, which ESA had launched only two months earlier.

Planetary parade: worlds on show

Vasudevan Mukunth

In a small window of time around February 28, people on the earth were in for a visual treat as seven planets, plus the moon, lined up in the night sky. These events are called planetary parades because the planets seem to line up, one behind the other, in the night sky in the order of their distance from the sun.

Depending on the number of planets involved, planetary parades can be common or rare. For example, a parade of three or four planets occurs once every few years, whereas a parade of seven or eight planets is very rare. The parade around February 28 was of the latter variety, involving seven planets: Mercury, Venus, Mars, Jupiter, Saturn, Uranus, and Neptune.

The closer planets were visible to the naked eye, but the farther ones, especially Uranus and Neptune, required telescopes to see.

The next such line-up is only expected in 2040, involving six planets.

Planetary parades are not particularly significant to scientists but they can create a visual spectacle. GETTY IMAGES

Planetary parades are not particularly significant to scientists. The reason why they happen is simple: the planets of the solar system all orbit the sun in roughly the same plane, called the ecliptic plane. So as they move in their orbits, every once in a while some of them will be visible together from the earth. This wouldn't have been possible if the planets were moving around in different orbits.

(mukunth.v@thehindu.co.in)

Topic → What is a Planetary Parade?

A planetary parade refers to a celestial alignment where planets appear to line up in the night sky. This captivating occurrence is not only visually stunning but also holds a significant place in the annals of astronomy.

Classification of Planetary Parades:

Simple parade: Involves three or four planets.

Grand parade: Involves five or more planets; rarer and more spectacular.

Historical Context: Notable parades have occurred throughout history, with some being recorded by ancient civilizations.

The Science Behind Planetary Alignments

The mechanics of planetary parades are rooted in the orbits of planets around the sun. All planets in our solar system orbit in a plane known as the ecliptic plane. This arrangement is why alignments happen from time to time.

Understanding Orbits:

Planets orbit in elliptical paths, occasionally aligning due to their relative positions.

The gravitational forces and distances play a crucial role in their visibility.

Significance in Astronomy:

While planetary parades aren't particularly significant for scientific research, they offer a wonderful opportunity for public engagement with astronomy.

The student and the three language debate

R. Seshasayee

is a corporate director and author

In the rhetoric of partisan politics surrounding the three language formula, unsurprisingly, the most important stakeholder has been forgotten: the student.

First, it is the child who goes to a public (government) school, and no one else, who should be at the very centre of this debate. Students in public schools form about 55% of the school enrolment in Tamil Nadu. Children in private schools (largely from the upper class) increasingly rely on supplemental learning beyond school hours, i.e., coaching or tuition classes, which a public school student cannot afford. The critical question is this: is learning three (instead of two) languages essential to enable a child from a public school to compete with other more privileged candidates in the job market and become a productive, value-adding citizen?

Second, while the National Education Policy (NEP) is path-breaking on many accounts, there are a few provisions that ignore the ground realities of public education in India, especially at the primary and secondary levels. The three language formula is one such issue.

A problematic hypothesis

The NEP declares that the compulsory learning of three languages is intended to improve the cognitive ability of students, enable mobility for employment and promote national integration. This very hypothesis is a problematic one.

Language is a necessary tool for acquiring knowledge and for communication. However, with the breathtaking progress in technology, particularly Artificial Intelligence, language proficiency itself will gradually lose its significance as a tool for knowledge acquisition. You could post your query in any language, in say Google Gemini (even children in a public school will hopefully soon have access either through a smart classroom or a smartphone), and get an answer instantly.

In the years ahead, this access will only get cheaper and better. There is of course indisputable evidence linking language skills with cognitive abilities, but none which establishes that proficiency in more languages will proportionately improve cognitive abilities. In fact, research suggests quite the contrary – that a strong foundation in a child's mother tongue is essential before introducing additional language(s).

A third language will certainly enable better communication with the community that speaks that language. But that is a choice that most adults make as a part of the profession they choose. Tamil '*thambis*' quickly learn Hindi when they join the Indian Army and thrive famously. Tamilian salesmen speak flawless Marathi when they sell their wares in Maharashtra.

Third, the state of primary education is pathetic, nationally and in Tamil Nadu, as highlighted in the Annual Status of Education Report (ASER) Survey 2024. Despite some good initiatives in recent times, 88% of class three students in Tamil Nadu still lack basic literacy proficiency.

The challenge is even greater with the second language, English. Many top-scoring students, even from English-medium public schools, struggle to adapt when transitioning to English-medium instruction in college, particularly in professional courses, because in the school, they are taught in Tamil, not in English.

Focus on teaching and learning

The response to the shocking state of quality in primary (and carried forward to secondary and higher secondary) education is to massively improve teaching quality and learning outcomes, and not to add one more language. There is a finite time available at school to 'cover' all subjects. With acquisition of knowledge getting easier and quicker through technology, education should increasingly focus on developing attributes such as curiosity, critical thinking and creativity, which are critical to success in the 21st century. There is a need to provide more time and space in the curriculum for inculcating these traits, rather than thrusting a third language. Within this finite time, it is important to enable deeper learning than wider learning.

Fourth, it is not clear how public schools would be able to find adequate and competent teachers for a third language, even assuming that every parent chooses Hindi and not a variety of other languages. There is every reason to fear the quality of teachers leading to inferior learning. Despite Tamil Nadu having one of the highest per-child education budgets in the country, 80%-90% of the budget is spent on teacher salaries, while infrastructure suffers. The cost of having third language teachers could eat into the funds available for infrastructure.

Language is a great anchor of cultural values. National unity is indeed a foundational value, and the Constitution provides for the propagation of Hindi. While a common language is desirable, it would be at the tail end of cultural initiatives to promote unity. A spirit of respect for other cultures and a shared sense of history should be an integral part of learning. A third language is neither the only nor a superior way to inculcate these values.

That said, education should lead to a choice of gainful employment opportunities. So long as opportunities for public school students are available within the State, either from government, private enterprise or self employment (the case thus far), the need for a third language may not be critical. However, the system outcomes must facilitate wider choices for students from Tamil Nadu to compete for the best educational and employment opportunities, nationally and even globally.

So long as English continues to be an official language in examinations for central services, the defence services and the judiciary, students from Tamil Nadu should be able to compete at a national level, as they have done successfully for several decades. Better teaching/learning of English would improve their competitiveness in the world, which is increasingly looking for English-literate service providers.

The politics and the student

So, what is the way forward? There are two dimensions to this problem: politico-cultural and child development.

The right or wrong of the ruling party's politics on the issue is not the subject of this article. But it is important to acknowledge ,from a child development perspective, that it is a two-front political battle, i.e., one, stopping Hindi 'imposition' on the State; and two, fighting to retain the robust status of English nationally. The second is a more challenging task.

The State's politics may not harm the future of students, as long as English continues as an official language at the Centre with equal force and usage.

However, if, nationally the landscape is likely to change with Hindi progressively replacing English (in spirit even if not in letter because of constitutional safeguards), the State's politics should factor this reality and seriously consider insulating the child's development from the crossfire of political battles.

Here is a possible approach that has the interests of the child in mind.

Since there is no academic merit in thrusting a third language on the child, particularly at the primary level, Hindi could be offered, as an option as a third language from middle public school. This could be started in schools in the district headquarters and progressively expanded to other schools, depending on demand, which, in turn, will depend on the momentum of Hindi replacing English at the national level.

A rigid political position could result in a generation of students that is handicapped to compete nationally. This issue should be a debate and a discussion, and not a war that destroys the future of the young.

There is no academic merit in thrusting a third language on students; there could be a risk of raising a generation that is handicapped to compete nationally

Topic → The National Education Policy (NEP)

The National Education Policy (NEP) has made waves with its ambitious goals, but some provisions, particularly the three-language formula, seem disconnected from the realities of public education in India.

Overview of the Three Language Formula

The NEP posits that compulsory learning of three languages will enhance cognitive abilities, facilitate employment mobility, and promote national integration. However, this hypothesis is fraught with issues.

The Hypothesis Behind Language Learning

While language is indeed a vital tool for knowledge acquisition, the rapid advancements in technology, especially Artificial Intelligence, suggest that language proficiency may soon become less significant. Imagine being able to ask a question in any language and receiving an answer instantly through platforms like Google Gemini.

The Reality of Language Proficiency

Technology's Role in Language Acquisition

As technology continues to evolve, access to information will become cheaper and more widespread. While there’s evidence linking language skills to cognitive abilities, there’s no conclusive proof that knowing multiple languages will significantly enhance cognitive function. In fact, research indicates that a strong foundation in a child’s mother tongue is crucial before introducing additional languages.

The Importance of Mother Tongue

A third language may improve communication with certain communities, but it’s often a choice made by adults based on their professional needs. For instance, Tamil speakers often learn Hindi when they join the Indian Army, but this is a personal choice rather than a mandated requirement.

Focus on Quality Teaching and Learning

The Need for Improved Educational Outcomes

Instead of adding another language to the curriculum, the focus should be on improving teaching quality and learning outcomes. With limited time in school, it’s essential to prioritize deeper learning over broader learning.

The Limitations of Adding a Third Language

The introduction of a third language could dilute the time and resources available for teaching core subjects.

Teacher Availability and Quality

Budget Constraints in Public Education

One major concern is the availability of qualified teachers for a third language. Despite Tamil Nadu having one of the highest per-child education budgets, a significant portion is allocated to teacher salaries, leaving little for infrastructure improvements.

The Impact on Infrastructure

The financial burden of hiring third language teachers could further strain the already limited resources for infrastructure development.

Cultural Values and Language

National Unity vs. Language Diversity

While language can be a powerful anchor for cultural values, promoting national unity should not solely rely on a third language. Respect for diverse cultures and shared histories should be integral to education.

Employment Opportunities for Public School Students

The Role of English in Job Markets

As long as public school students have access to employment opportunities within the state, the necessity for a third language may not be critical. However, enhancing English proficiency is vital for competing in a global job market.

The Political Landscape and Its Impact on Students

The Two-Front Political Battle

The political landscape surrounding this issue is complex. It’s essential to recognize that the debate is not just about stopping Hindi imposition but also about preserving the status of English nationally.

Future of English and Hindi in Education

If Hindi begins to replace English nationally, it’s crucial to insulate children’s development from political conflicts.

A Possible Way Forward

Offering Hindi as an Optional Language

One potential solution is to offer Hindi as an optional third language starting in middle school, based on demand. This approach could prevent a generation of students from being disadvantaged in the national job market.

The Importance of Dialogue Over Conflict

Ultimately, this issue should be approached as a discussion rather than a battleground that jeopardizes the future of our youth.

Conclusion

In conclusion, the three-language formula debate must prioritize the needs of students, particularly those in public schools. By focusing on quality education and offering language options based on demand, we can ensure that our children are equipped to thrive in an increasingly competitive world.

What were the objections to new Advocates Bill?

Why has the Advocates (Amendment) Bill, 2025 been retracted for now? Why is the Bar Council of India peeved with some of the proposed changes? Why are some of the amendments being seen as an effort to undermine judicial independence?

Aaratrika Bhaumik

The story so far:

On February 22, the Centre withdrew the contentious Advocates (Amendment) Bill, 2025, stating that a revised version incorporating public feedback will be introduced. The Bill sought to amend the Advocates Act, 1961. However, its introduction faced strong opposition from sections of the bar. The government's decision to retract the Bill followed a letter from the Bar Council of India (BCI) to Union Law Minister Arjun Ram Meghwal, pointing out that the proposed amendments threatened the "autonomy and independence of the bar."

What is the objective of the Bill?

The Law Ministry underscored the need to amend the 1961 Act to address "contemporary challenges" and align the legal profession with global best practices. It pointed out that seismic shifts in the legal landscape necessitate reforms to better equip lawyers for a rapidly evolving world. The draft Bill comes over a year after the introduction of the Advocates Bill, 2023, which was passed to eliminate "touts" and curb "superfluous enactments" in existing statutes.

Are lawyers allowed to go on strike?

A key point of contention in the Bill is its proposed ban on strikes and boycotts by lawyers, citing their disruptive impact on judicial proceedings. It introduces Section 35-A, explicitly prohibiting advocates and bar associations from abstaining from court work. Violations would constitute "misconduct," subjecting offenders to disciplinary action under the 1961 Act and the Bar Council of India Rules, 1975. However, the Bill clarifies that the restriction does not apply to strikes that do not "impede the administration of justice" and are intended to address "legitimate concerns about professional conduct," such as working conditions or administrative issues.

A key point of contention in the Bill is its proposed ban on strikes and boycotts by lawyers

In rage: Lawyers stage a protest against the Advocates (Amendment) Bill, 2025, in Ajmer on February 21. ANI

Senior advocate Chander Lall underscored that strikes are a legitimate means for lawyers to voice grievances. "The Bill's withdrawal was a direct consequence of protests led by various bar associations. However, court boycotts and strikes inevitably disrupt judicial proceedings, ultimately harming litigants. That said, I believe the bar exercises restraint and resorts to strikes only in cases of extreme exigency," he told *The Hindu*. Echoing similar sentiments, advocate Nipun Saxena pointed out that strikes have historically served as a powerful tool for the legal fraternity to oppose state excesses. "Barrister Dr. Saifuddin Kitchlew was among the earliest vocal opponents of the Rowlatt Act, 1919, which granted the British government sweeping powers to arrest and detain individuals without trial in colonial India. He organised widespread boycotts of British courts by Indian lawyers....Lawyers have long stood as the first line of defence in safeguarding the rule of law and preserving constitutional values," he said.

Is there executive control?

The proposed law allows the Centre to nominate up to three members to the BCI, alongside its existing members – the Attorney General, Solicitor General, and representatives from State Bar Councils. The BCI has strongly opposed this provision, calling it "draconian" and "arbitrarily inserted." The Bill also introduces Section 49B, empowering the Centre to issue binding directions to the BCI, set bar council eligibility criteria, and regulate the BCI's oversight of State bar councils. "Since the government is the largest litigant, it should have no role in an autonomous body like the BCI. Such influence would undermine judicial independence, as advocates serve as officers of the court," Mr. Lal told *The Hindu*.

The amendments significantly expand the BCI's authority, potentially rendering State bar councils redundant. Traditionally, misconduct complaints against advocates are handled by the disciplinary committees of State bar councils. However, Section 45B now allows the BCI to hear complaints nationwide and suspend advocates at its discretion. Additionally, Section 48B empowers the BCI to dissolve a State bar council and replace it with a committee if it deems the council ineffective. Mr. Saxena argued that these changes undermine the federal structure of the 1961 Act. "The BCI and State bar councils were created under distinct provisions. Stripping State councils of their core functions reduces them to mere administrative bodies with no real authority," he said.

How will it impact corporate lawyers?

The Bill expands the definition of "legal practitioner" under Section 2(i) to include lawyers associated with foreign law firms, corporate entities, and practising advocates. It grants statutory recognition to corporate lawyers working in law firms and as in-house counsel – a long-standing demand that has gained momentum in recent years. Additionally, the Bill empowers the Centre to formulate rules governing the entry of foreign law firms and lawyers into India. This has faced strong opposition from the BCI.

The Bar Council of India Rules for Registration and Regulation of Foreign Lawyers and Foreign Law Firms in India, 2022, allows foreign lawyers and firms to practise law in India on a reciprocal basis. However, these rules were later challenged before the Delhi High Court, with petitioners arguing that the BCI lacked the statutory mandate to permit such practice. "This proposed change would have had little impact on corporate lawyers in law firms, as most are already licensed advocates. However, its implications are far more significant for in-house counsel. A crucial question is whether this move intends to gradually blur the distinction between 'advocates' and 'legal practitioners'. For instance, would in-house counsel be granted rights of audience before courts, arbitral tribunals, and other judicial fora? Moreover, it could have definitively settled the long-standing debate on whether legal privilege extends to advice provided by in-house counsel to their employers", Mrinal Ojha, partner at Solaris Legal told *The Hindu*. He further pointed out that while the structured entry of foreign law firms into India is a welcome development, the proposed framework remains ambiguous.

"Jurisdictions like Singapore serve as valuable precedents, having successfully balanced the interests of international law firms and the domestic legal fraternity. However, for any regulations introduced by the Centre to be effective, they must be formulated in consultation with all key stakeholders – the BCI, bar associations, and the legal community at large," Mr. Ojha added.

What is the way forward?

"The Bill's withdrawal is a welcome step, and one hopes that inclusive dialogue will lead to meaningful reforms. Any changes must safeguard judicial independence and the autonomy of regulatory bodies," Mr. Lal stated.

Mr. Saxena further underscored the need to consult High Courts before implementing any reforms, noting that Section 34 of the 1961 Act empowers them to regulate the practice of advocates before them and subordinate courts.

Topic → The Advocates (Amendment) Bill, 2025:

Background of the Bill

The Advocates (Amendment) Bill was conceived as a response to the evolving landscape of legal practice in India.

> **Objective:** To modernize the Advocates Act of 1961, making it more relevant to current challenges.
> **Context:** A follow-up to the Advocates Bill of 2023, aimed primarily at curbing the influence of "touts" and streamlining legal processes.

The government's intent was to elevate the standards of the legal profession to match international benchmarks, thereby enhancing the efficacy of legal practitioners.

Opposition from the Bar

The proposed bill did not sail smoothly.

- **Concerns Over Autonomy:** The Bar Council of India (BCI) expressed serious apprehensions that the bill threatened the independence of legal practitioners. They argued that amendments could compromise the very essence of justice.
- **Protests Erupt:** Numerous protests were organized by lawyers across the country, emphasizing the need for consultation before implementing such significant changes.

The BCI's proactive stance led to a critical review of the bill, culminating in a letter to the Union Law Minister, which played a decisive role in the government's withdrawal decision.

Key Provisions and Their Implications

Among the most contentious elements of the bill were the following:

Ban on Strikes and Boycotts: Section 35-A aimed to prohibit advocates and bar associations from abstaining from court work. This ban was seen as a potential infringement on the rights of lawyers to express their grievances.

Government Control Over BCI: The bill proposed allowing the government to nominate members to the BCI, raising alarms about potential government overreach into the autonomy of the legal profession.

Recognition of Corporate Lawyers: The bill sought to include corporate lawyers within its definition of "legal practitioners," a move that many believed would legitimize their contribution to the legal landscape while raising questions about their rights.

This array of provisions sparked heated debates about the future of legal practice and the essential balance between reform and autonomy.

Conclusion

- The withdrawal of the Advocates (Amendment) Bill, 2025, serves as a poignant reminder of the delicate balance between necessary reforms in the legal profession and the paramount need to uphold its autonomy.
- The strong opposition from the bar highlights the importance of engaging with the legal community in meaningful consultations.
- As the government gears up to introduce a revised version of the bill, addressing the concerns raised will be vital for fostering a legal system that is both modern and just.

Gene therapy for maple syrup urine disease shows promise

The Hindu Bureau

Scientists have created a new gene therapy for a debilitating genetic disorder called maple syrup urine disease (MSUD). The treatment can prevent recurrence of deadly symptoms in a cow-calf born with the disease. Their protocol could one day be translated into a much-needed therapy for patients with two types of classic MSUD, who currently face limited treatment options. Results were published in *Science Translational Medicine*.

Classic MSUD arises from mutations in the three genes that encode the protein subunits of the branched chain alpha-keto acid dehydrogenase complex (BCKDH). The loss of this complex prevents the body from properly breaking down several amino acids, eventually leading to neurological symptoms and life-threatening brain damage. To prevent complications, patients must either follow a very strict diet low in protein or receive a liver transplant.

Now, Dr. Jiaming Wang from the University of Massachusetts Chan Medical School, Worcester, Massachusetts and others present a new gene replacement therapy for two types of classic MSUD that uses an adeno-associated viral vector to deliver functional gene copies of BCKDHA and BCKDHB systemically. The therapy worked as intended in knockout cells and was safe in wild-type mice, and also prevented death after birth in mice deficient in either BCKDHA or BCKDHB.

The scientists visited a farm where some newborn calves had perished from classic MSUD. They administered a single dose of their gene therapy, modified to carry bovine genes, to the animal. Over the next two years, the calf grew normally and was eventually able to transition to a normal bovine diet high in protein.

The team plans on further work to characterize the long-term impact of the gene therapy on BCKDH levels in the brain, as well as to determine the treatment's benefits on cognition and behaviour over longer study periods.

Topic → Introduction to Maple Syrup Urine Disease (MSUD)

Maple Syrup Urine Disease (MSUD) is a rare and severe genetic disorder that disrupts the body's ability to break down certain amino acids, leading to a plethora of neurological symptoms that can be life-threatening.

The condition stems from mutations in genes responsible for encoding the subunits of the branched chain alpha-keto acid dehydrogenase complex (BCKDH).

Symptoms: Patients often experience developmental delays, seizures, and cognitive impairments.

Dietary Management: Due to the disease's severity, individuals must adhere to a stringent low-protein diet or may require a liver transplant to survive.

Understanding BCKDH's Role

The BCKDH complex is pivotal for metabolizing branched-chain amino acids. Without it, toxic byproducts accumulate, leading to irreversible neurological damage.

Innovative Gene Therapy Development

Recent breakthroughs from Dr. Jiaming Wang and his colleagues at the University of Massachusetts Chan Medical School have introduced a promising gene replacement therapy using an adeno-associated viral vector. This innovative treatment aims to deliver functional copies of the genes BCKDHA and BCKDHB.

Animal Studies: The therapy demonstrated effectiveness in knockout cell lines and was found safe in wild-type mice, preventing neonatal mortality in genetically deficient mice.
Real-World Application: The team applied the therapy in a farm setting where calves were dying from classic MSUD. Remarkably, after just one dose, the treated calf thrived, transitioning to a high-protein diet.

Extreme heat may speed up aging in older adults: study

A study has revealed a correlation between neighbourhoods with more days of extreme heat and individuals experiencing greater increases in biological age. Researchers examined how biological age changed in more than 3,600 participants aged 56 and older from throughout the U.S. Blood samples taken during the study period were analysed for changes in the way individual genes are turned “off” or “on” by a process called DNA methylation.

Topic → DNA Methylation: An Overview

🧬 **DNA Methylation**: A biochemical process involving the addition of a methyl group to the DNA molecule.

🔬 **Role in Gene Expression:** Crucial for regulating gene expression and influencing cellular functions.

🧪 Inheritance and Development: Methylation patterns can be inherited and are essential for normal development and cellular differentiation.

🫓 Association with Diseases: Abnormal DNA methylation is linked to various diseases, including cancer and genetic disorders.

📊 **Epigenetic Mechanism:** A key mechanism in epigenetics, studying heritable changes in gene function without altering the DNA sequence.

🧪 **Analysis Techniques:** Techniques like bisulfite sequencing are used to analyze DNA methylation patterns.

🌱 **Environmental Impact:** Environmental factors and lifestyle choices can impact DNA methylation, affecting health and disease risk.

Summary: DNA methylation is a vital epigenetic mechanism that regulates gene expression and is linked to various health conditions

Study identifies sources of PM2.5 in northern India

The Hindu Bureau

A study published in the journal *Nature Communications* has investigated the sources and health impacts of PM2.5 in Northern India, particularly in the Indo-Gangetic Plain. The study has examined PM2.5 composition and oxidative potential, a key indicator of its health risks, using samples from five sites: urban and roadside locations in Delhi, rural and industrial peripheries, and a suburban site in Kanpur. Addressing local inefficient combustion processes can effectively mitigate particulate matter health exposure in northern India, the study finds.

The study found that although uniformly high particulate matter concentrations were recorded across the entire region, local emission sources and atmospheric processes dominate particulate matter pollution. "In Delhi, PM2.5 is dominated by ammonium chloride and organic aerosols from vehicular emissions, residential heating, and fossil fuel oxidation," says Dr. Sachchida N. Tripathi, Professor at the Department of Civil Engineering & Department of Sustainable Energy Engineering, IIT Kanpur, and one of the corresponding authors. "Outside Delhi, ammonium sulfate, ammonium nitrate, and biomass-burning-derived organic aerosols are more prominent." The study highlights that PM2.5 oxidative potential is primarily influenced by organic aerosols from incomplete combustion of biomass and fossil fuels, particularly from traffic and residential sources. This trend is observed across all locations, emphasising that inefficient local combustion

Major contributor: Traffic can contribute up to 40% of total organic aerosols at urban roadside. GETTY IMAGES

is a major contributor to PM2.5-related health risks.

Hydrocarbon-like organic aerosols originate from fresh vehicular tailpipe emissions. The study found that the highest average hydrocarbon-like organic aerosols concentrations (8 micrograms per metre cube) were recorded at the urban roadside site in Delhi. The hydrocarbon-like organic aerosol concentrations do not show great variations across seasons.

Consistent with previous studies, the current study found that hydrocarbon-like organic aerosols are primarily from traffic and contribute up to 20% of total organic aerosols mass with higher relative contributions in the warm season. From 20%, the contribution from traffic can increase to 40% at an urban roadside. "In all, hydrocarbon-like organic aerosols constitute 50% of the total fossil (coal, petrol, diesel) organic aerosols," says Dr. Tripathi.

Cow dung combustion during winter for heating and cooking contributes to cold-season primary organic aerosols. The cold-season primary organic aerosols are highly elevated during the night and exhibit spatially homogeneous contribution. Also, concentration of cold-season primary organic aerosols during cold weather is up to 10 times higher than during warmer weather. This is because of increased residential heating or cooking emissions and shallower boundary layer conditions.

Urban oxygenated o
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Comparative analys
shows that the oxidati
potential of PM2.5 in I
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highest globally, exceedi
levels in Chinese and Eur
pean cities by up to fi
times. "The study provid
crucial insights for polic
makers to design effecti
air quality control strat
gies focused on reduci
primary emissions from i
complete combustion
says Dr. Tripathi.

Topic → PM2.5 Pollution in Northern India: A Comprehensive Study

🌍 Study Focus: Investigated PM2.5 sources and health impacts in Northern India, particularly the Indo-Gangetic Plain.

🏙️ Sample Locations: Analyzed samples from urban and roadside sites in Delhi, rural and industrial areas, and a suburban site in Kanpur.

🔥 Pollution Sources: PM2.5 in Delhi is mainly from ammonium chloride and organic aerosols due to vehicular emissions and fossil fuel use; outside Delhi, ammonium sulfate and biomass burning are more significant.

🚗 Hydrocarbon Aerosols: Highest concentrations of hydrocarbon-like organic aerosols (8 μg/m³) found at urban roadside sites in Delhi, contributing up to 20% of total organic aerosols, increasing to 40% in urban areas.

❄️ Cold-Season Effects: Cow dung combustion significantly raises primary organic aerosol levels in winter, with concentrations up to 10 times higher than in warmer months.

📊 Global Comparison: PM2.5 oxidative potential in Indian cities is among the highest globally, exceeding levels in China and Europe by up to five times.

📈 Policy Implications: Findings emphasize the need for effective air quality control strategies targeting emissions from inefficient combustion processes.

Summary: A study reveals that PM2.5 pollution in Northern India is primarily driven by local combustion sources, with significant health risks, particularly in urban areas like Delhi

Question Corner

Symbiosis

Does anemonefish actively feed its hosts in the wild?

Living symbiotically with sea anemones that shelter them from predators, anemonefish (*Amphiprion clarkii*) drive away organisms that nibble at their hosts. Anemonefish have also shown they will provide their hosts with the food given to them by humans. A new study shows such feeding behaviour does happen in the wild by investigating food provisioning by anemonefish and its effects on the symbiotic relationships. When anemonefish are provided with foods of various sizes and types in the field, they selectively consume small animal food (krill, clams, squid, and fish) and green macroalgae of small size, while providing larger pieces of animal food to their hosts. Food provisioning positively influences the growth of host anemones as growth of anemones directly benefits anemonefish – the number of eggs laid increases when the hosts are larger, and since anemonefish cannot leave their sea anemone, feeding their hosts is extremely important.

Readers may send their questions / answers to questioncorner@thehindu.co.in

Topic --.> Anemonefish and Their Symbiotic Relationship with Sea Anemones

🐠 Anemonefish (Amphiprion clarkii) live symbiotically with sea anemones, which provide them with shelter from predators.

🦐 They actively protect their host anemones by driving away harmful organisms, ensuring a healthy environment.

🍽️ Recent studies confirm that anemonefish exhibit food provisioning behavior in the wild, enhancing their symbiotic relationship.

🐟 In their natural habitat, anemonefish selectively consume small animal foods such as krill, clams, squid, and fish, along with small green macroalgae.

🌱 They provide larger pieces of animal food to their host anemones, which positively influences the anemones' growth.

🥚 The growth of host anemones leads to an increase in the number of eggs laid by anemonefish, highlighting the importance of this feeding behavior.

🌊 Anemonefish cannot leave their sea anemone, making the feeding of their hosts crucial for their survival and reproduction.

Summary: Anemonefish engage in food provisioning to support their host sea anemones, which in turn benefits their own reproductive success.

ICMR report links high levels of selenium in wheat to hair loss

The ICMR interim report submitted to the Health Ministry on January 28 found consumption of wheat with high levels of selenium led to 31 times higher selenium in the body causing sudden hair loss

R. Prasad

Unwillingness to be transparent, a recurring tale

Over 300 people in Shegaon taluka in Buldhana district, Maharashtra, experienced sudden hair loss

1 Scientists from ICMR institutes and AIIMS Delhi visited villages from **January 14-17** and collected wheat, rice, water, soil and various human samples

2 ICMR submitted an interim report to the Health Ministry on **January 28**, nearly a month before PTI published the results of an independent researcher

3 Selenium levels in the blood were about **31 times** higher. Hair had high selenium content

4 Selenium in wheat samples collected from ration shops was **two-eight times** higher

5 Selenium levels in the affected people were **three times more** than the unaffected individuals from the same household

PHOTO CREDIT: CDC

Selenosis: Intake of excessive selenium leads to a condition called selenosis, which is characterised by sudden hair loss

6 Wheat collected from rations shops and affected households had high levels of selenium, establishing a link between high selenium in wheat and sudden hair loss

7 A 2016 report in an Indian journal found 15 individuals from two families with high to extreme selenium toxicity had high selenium levels. Selenium in wheat was 250 times higher

Three Zika virus cases in Gujarat detected between November 2016 and February 2017 were kept under wraps till WHO announced the outbreak on May 26, 2017; the Health Ministry had informed WHO about the three cases on May 15, 2017. The case of high levels of selenium in wheat distributed by Public Distribution System (PDS) outlets causing increased selenium levels and sudden hair loss in over 300 people in Shegaon taluka in Buldhana district, Maharashtra, seems to be following the same pattern – reluctance of the Health Ministry to keep all the stakeholders informed and make the findings public, and then claim there is no conclusive evidence to link high selenium levels in wheat with sudden hair loss.

Between end-December 2024 and January this year, over 300 cases of sudden hair loss were reported in people living in 18 villages in Shegaon taluka. From January 14-17, a team of scientists from ICMR institutes and AIIMS Delhi visited three villages and collected samples from people affected and unaffected (control) by sudden hair loss. Samples of wheat and rice from affected and unaffected households and from ration shops were collected, as well as water and soil samples. Contrary to claims made by government sources, no other samples of food items were collected for testing by the ICMR-AIIMS team. The samples were sent for testing to ICMR-National Institute for Research in Environmental Health (NIREH) in Bhopal and AIIMS Delhi.

A PTI report published on February 25 said that very high levels of selenium found in wheat was the reason for the sudden hair loss, based on an independent investigation by Dr. Himmatrao Bawaskar of Bawaskar Hospital and Research Centre in Raigad. The ICMR-AIIMS team found high selenium in blood and hair samples of affected people, and the link between high selenium levels in wheat and hair loss nearly a month before Dr. Bawaskar's investigation revealed them. But the findings of the ICMR-AIIMS team have not been made public till date.

In an interim report submitted to the Health Ministry on January 28, ICMR clearly said that the amount of selenium detected in the blood of affected individuals was about 31 times higher than controls. The selenium content was also high in wheat samples collected from two ration shops and a few households of affected people. Water samples were tested for nearly two-dozen heavy metals, and all were within permissible limits. Based on these findings, the interim report says that high selenium levels in wheat could have caused sudden hair loss. Intake of excessive selenium through food and/or water leads to a condition called selenosis, which is characterised by hair loss, which is what was seen in people in Shegaon taluka.

Blood samples tested by ICMR-NIREH found that people with sudden hair loss had selenium levels nearly 31 times higher than individuals without hair loss from households with no cases of hair loss in the family. Selenium levels in the affected people were three times more than the unaffected individuals from the same households as the affected people. Blood samples tested by AIIMS Delhi found that the selenium levels were about 25 times more than the controls, and the selenium levels in hair samples from people with sudden hair loss were also high compared with the control group.

Testing by ICMR-NIREH of wheat samples supplied by two ration shops to the affected people living in two villages had selenium two-eight times higher than normal values. The selenium level in the wheat sample collected from a household where an affected person was living was high and comparable to the selenium levels in wheat available at the ration shop. Compared with households of unaffected individuals, people from affected households consumed wheat and rice supplied by PDS shops. The presence of wheat with high levels of selenium both in the ration shops and in the affected households clearly establishes that wheat distributed by the PDS outlets as the source of selenium for the affected people.

As per a Letter published in 2016 in the *Indian Journal of Dermatology, Venereology, and Leprology*, a study by the SMS Medical College and Hospital in Jaipur found 15 individuals from two families with high to extreme selenium toxicity. Selenium in wheat samples was 250 times higher. As per a 2004 report in *Down to Earth*, large tracts of agriculture lands in Hoshiarpur and Nawanshahar districts in Punjab are impacted and people in many villages in these districts are affected by selenium toxicity.

Investigations needed

It must be noted that while every family receives PDS wheat, not everyone eats this wheat. Many families have wheat grown in their own field. As a result, the wheat samples collected from houses were not necessarily received from PDS shops. Curiously, people who had sudden hair loss in end-December 2024 had good hair regrowth even though they continued to consume wheat supplied by PDS shops. This suggests that the exposure to high selenium was only for a short time, probably because only a few sacks of wheat had high selenium levels. The cases were reported only from 12-15 villages, again supporting the hypothesis that only a few sacks would have had high selenium. It is therefore necessary to carry out further investigations by testing additional wheat samples from the entire supply chain of PDS to ensure that high selenium wheat is not present in the supply chain.

Topic → High Selenium Levels in Wheat and Public Health Concerns

🌾 High Selenium Levels: Elevated selenium levels have been detected in wheat distributed by Public Distribution System (PDS) outlets.

🏥 Health Impact: Over 300 individuals in Shegaon taluka, Buldhana district, Maharashtra, have reported sudden hair loss.

🔍 Ministry's Stance: The Health Ministry has been hesitant to inform stakeholders and has not made the findings public.

❌ Lack of Evidence: The Ministry asserts there is no conclusive evidence linking the high selenium levels in wheat to the hair loss incidents.

📊 Transparency Issues: This situation highlights a recurring pattern of insufficient transparency in health-related matters.

⚠️ Health Risks: Elevated selenium levels in food can pose significant health risks to the population.

📉 Need for Action: The case underscores the necessity for improved communication and thorough investigation into public health issues.

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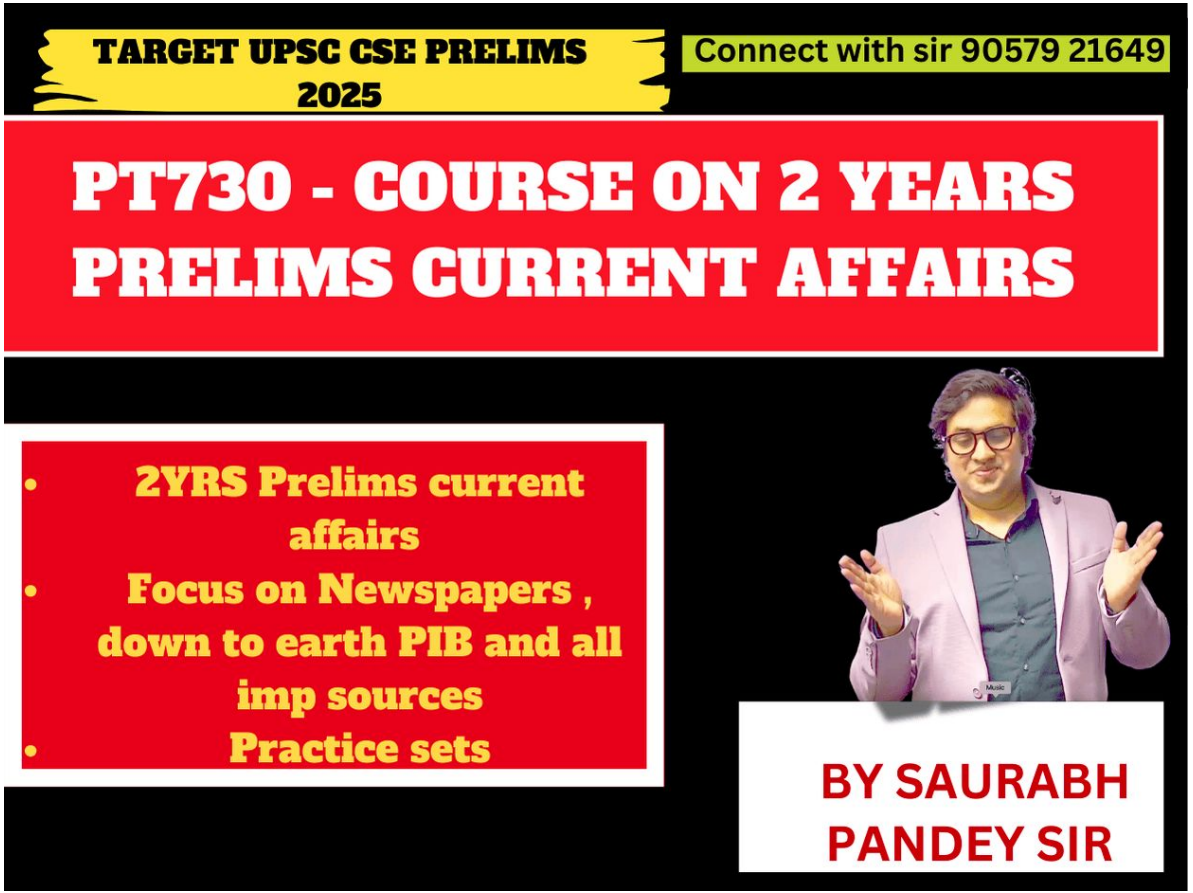

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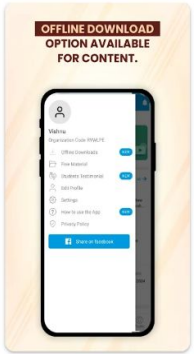

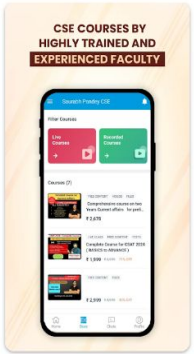

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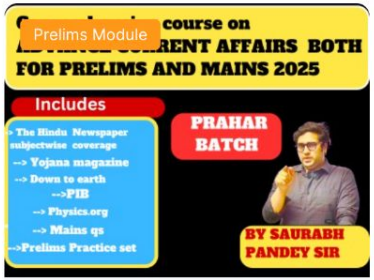

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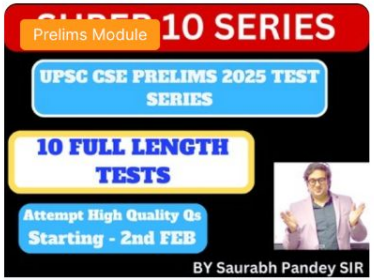

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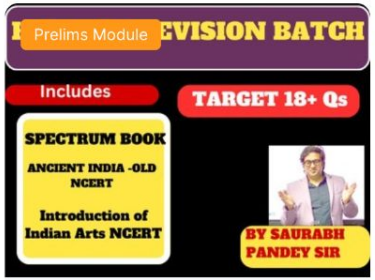

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