DINOSARUS: SCIENCE & TECHNOLOGY

NEWS: Where did dinosaurs first evolve? Scientists have an answer

WHAT'S IN THE NEWS?

Dinosaurs, a diverse group of reptiles that appeared during the Triassic Period, evolved after a mass extinction event and became dominant due to their unique traits. In India, significant dinosaur fossils, including Titanosaurus indicus, were discovered in the Lameta Formation of the Narmada Valley.

1. Introduction: What Are Dinosaurs?

- **Definition**: Dinosaurs are reptiles belonging to the clade *Dinosauria*.
- Appearance: Emerged during the Triassic Period, about 243–233 million years ago.
- Extinction: Went extinct around 66 million years ago due to a mass extinction event, likely caused by an asteroid impact or volcanic activity.
- Key Traits: Upright posture, efficient locomotion, and diverse dietary adaptations.

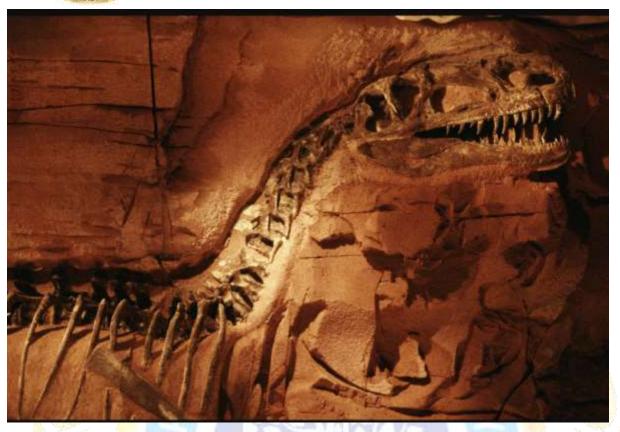
2. History of Dinosaurs in India

- Geological Background:
 - India was part of the southern supercontinent Gondwana, which later split into modern continents.
 - The Indian Plate moved northward, carrying with it fossil records from its Gondwanan past.
- First Discovery:
 - Year: 1828.
 - Location: Bara Simla Hill near Jabalpur, Madhya Pradesh.
 - Discoverer: Captain William Henry Sleeman of the East India Company.
 - Fossil: Holotype vertebrae of *Titanosaurus indicus*, later classified as a Late Cretaceous herbivorous dinosaur (145–65 mya).
- Significant Site: Lameta Formation:
 - Location: Narmada Valley (Central India).
 - Findings: Dinosaur nests, eggs, and skeletons.
 - Importance: Provides crucial evidence of dinosaur biodiversity in India.



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3. Significant Dinosaur Fossils Discovered in India

- Barapasaurus:
 - Type: Sauropod (long-necked herbivore).
 - Significance: Known as "big-legged lizard," one of the earliest sauropods.
- Isisaurus:
 - Type: Sauropod.
 - Features: Short neck compared to other sauropods.
- Indosuchus:
 - Type: Large theropod (carnivorous).
 - Characteristics: Known for its sharp teeth and predatory nature.
- Rajasaurus:
 - Type: Large theropod.
 - Features: A carnivore with a unique crest on its head, considered an apex predator.

4. Global Dinosaur Origins

- Proposed Origin Areas:
 - Likely regions: Present-day Sahara Desert and Amazon Rainforest.
 - Time Period: Dinosaurs first appeared on the southern supercontinent Gondwana during the Triassic Period.
- Oldest Dinosaur Fossils Found:
 - *Eoraptor* and *Herrerasaurus* (Argentina): Among the earliest known dinosaurs, ~230 million years old.

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- Saturnalia (Brazil): Early dinosaur ancestor.
- Mbiresaurus (Zimbabwe): Evidence of Gondwanan dinosaur distribution.

5. Evolution of Dinosaurs

- Mass Extinction Event:
 - Cause: Volcanic activity at the end of the Permian Period (~252 million years ago).
 - Impact: Wiped out 90% of marine species and 70% of terrestrial species, paving the way for dinosaurs to evolve.

• Early Dinosaurs:

- Initially small and less dominant in ecosystems.
- Larger animals like crocodile relatives and mammal-like creatures were dominant.

• Rise to Dominance:

- Around 201 million years ago, a mass extinction event eliminated their competitors.
- Dinosaurs diversified and became dominant terrestrial animals.

• Unique Traits:

- Upright stance for efficient movement.
- Specialized hips and teeth adapted to various diets.
- Examples:
 - *Herrerasaurus*: A 6-meter-long predator.
 - *Eoraptor*: A small, omnivorous dinosaur.

6. Challenges in Tracing Dinosaur Origins

- Harsh Triassic Environment:
 - Climate: Extremely hot and dry conditions, vast deserts, and frequent wildfires.
 - Adaptations: Early dinosaurs and relatives adapted to these extreme environments.

• Scarcity of Fossils:

- Poor preservation conditions due to arid climates and erosion.
- Fossil exploration hindered by remote and dense regions like the Amazon and Sahara.
- Fragmentary fossils make it difficult to construct a complete evolutionary timeline.

Source: https://www.thehindu.com/sci-tech/science/where-did-dinosaurs-first-evolve-scientists-have-an-

answer/article69142579.ece#:~:text=%E2%80%9COur%20research%20suggests%20they%20likely,northern%20Africa%2C%E2%80%9D%20Heath%20added.