UPSC Daily Current Affairs | Prelim Bits 07-06-2024

Thismia malayana

Researchers recently discovered that a new plant species, Thismia malayana steals nutrients from underground fungi.

- **About –** It is a new plant species steals nutrients from underground fungi, typically found hidden in leaf litter and growing near tree roots or old rotten logs.
- **Group –** Mycoheterotrophs.

  Mycoheterotrophs do not perform photosynthesis, instead they act as a parasite, stealing carbon resources from the fungi on their roots.

- **Habitat -** Discovered in the tropical rainforests of Peninsular Malaysia.
- **Nutrition-** *Carbon resources* from the *fungi on their roots.*
- **Interconnectedness-** Malayana underscores the complex interconnectedness within ecosystems.
- **Adaptation- Symbiotic relationship** between colonizing fungi and a plant's roots, typically benefiting both parties.

  Symbiotic relationship *is an ongoing interaction between organisms of different species. The interaction usually benefits at least one of the organisms and can benefit both.*

- **Proliferation-** It thrives in the ***low-light conditions*** of dense forest understories, with its specialized flowers *pollinated by fungus gnats and other small insects.*
- **Conservation status**
  - **IUCN Red List**- Vulnerable

Reference

Physics Org | Thismia Malayana

Musankwa sanyatiensis

Recently, Scientists have discovered a new dinosaur species, named Musankwa sanyatiensis from fossils.

- **About -** It is a newly discovered dinosaur species found from fossils on the shoreline of ***Lake Kariba in Zimbabwe.***
- **Genus**- Musankwa.
- **Group –** Sauropodomorpha, a group of bipedal, long-necked dinosaurs that were widespread during the Late Triassic.

  Sauropodomorpha *is a group of bipedal, long-necked dinosaurs that were widespread during the Late Triassic.*

- **Dietary habits**- Herbivores.

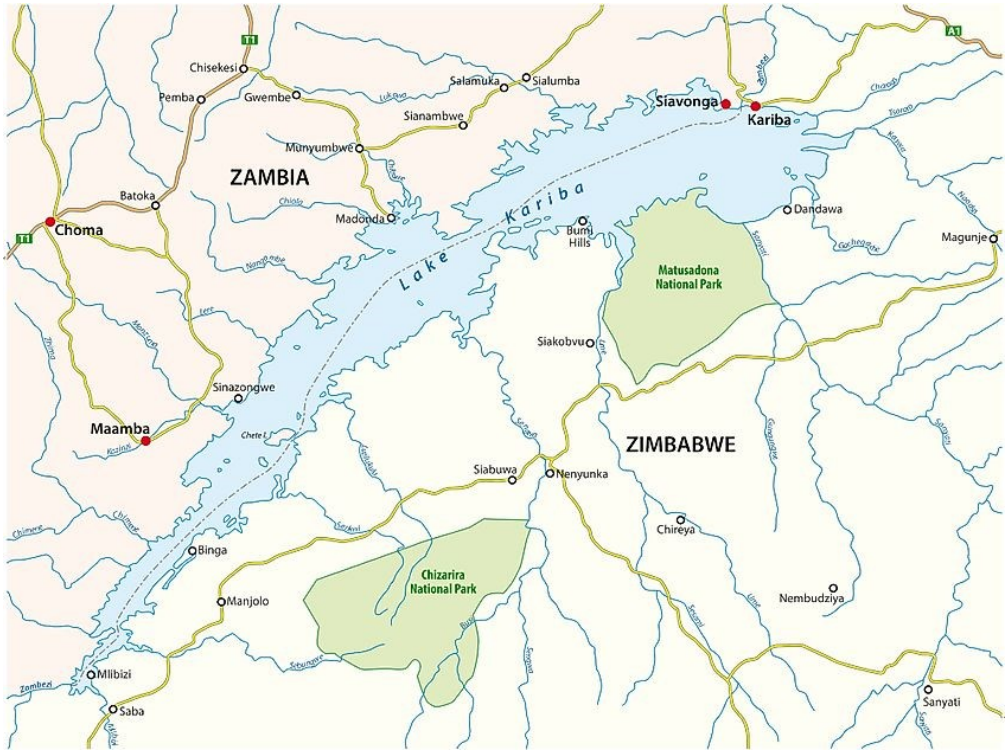
Recent Findings

- **Triassic period-** The rocks yielding this new specimen date back to *the Late Triassic period*, approximately **210 million years ago**.
- **Finding significance -** It is the ***1st dinosaur*** to be named from the Mid-Zambezi Basin of northern Zimbabwe in over 50 years and the ***4th dinosaur species*** named from Zimbabwe.
- **Evolution representation-** Remains of a single hind leg, including its thigh, shin, and ankle bones.

Quick facts

Lake Kariba

- Lake Kariba is located on the ***Zambezi River*** in ***southern Africa,*** on the border of ***Zambia and Zimbabwe.***
- It is the ***world's largest artificial lake*** and reservoir by volume.
- It witnessed the establishment of hydroelectric facilities through the ***Kariba Dam*** after 1960.



Reference

[The phys | Musankwa sanyatiensis]

Boeing starliner

A Boeing Starliner capsule carrying its first-ever astronauts docked with the International Space Station.

> **Starliner** *is the 6th US-built spaceship to carry NASA astronauts, following Mercury, Gemini, Apollo, the Space Shuttle, and SpaceX's Crew Dragon.*

- **Aim –** It is a spacecraft that carried astronauts to International Space Station (ISS).
- It is a *partially reusable crew capsule*, officially known as ***CST-100 (crew space transportation).***

- **Launched by-** The National Aeronautics and Space Administration (NASA).
- **Rocket-** A United Launch Alliance *Atlas V rocket*.
- **Modules –** It consists of crew module and the service module.

SpaceX launched astronauts into orbit in 2020, becoming the first private business to achieve only in 3 countries ***— Russia, the U.S. and China.***

- **Scope for taxi flights-** If the mission goes well, NASA will alternate between SpaceX and Boeing for *taxi flights*, beginning next year.

References

1. **The Hindu | Boeing Starliner**

PraVaHa Software

The Indian Space Research Organisation (ISRO) has developed Computational Fluid Dynamics (CFD) software named PraVaHa.

- **PraVaHa Software -** Parallel RANS Solver for Aerospace Vehicle Aero-thermo-dynamic Analysis.
- **About PraVaHa-** It is a software tool designed to ***analyze the aerodynamics and thermodynamics of aerospace vehicles***.
- **Developed by-** Indian Space Research Organisation (ISRO).
- The software simulates external and internal flows on launch vehicles, winged & nonwinged re-entry vehicles.
- **Usage**- It has been used extensively in the *Gaganyaan program for aerodynamic analysis of human-rated launch vehicles, viz, HLVM3, Crew Escape System (CES), and CM.*
- The software is designed to make use of CPU as well as GPU architecture of available and upcoming supercomputing facilities.
- Currently, the PraVaHa code is operational to simulate airflow for Perfect Gas & Real Gas conditions.
- PraVaHa soon will replace most of the CFD simulations for aero characterization, which is currently being carried out using commercial software.

Computational Fluid Dynamics (CFD)

• Computational Fluid Dynamics (CFD) is the process of mathematically predicting physical fluid flow by solving the governing equations using computational power.
• In a CFD software analysis, fluid flow and its associated physical properties, such as velocity, pressure, viscosity, density, and temperature, are calculated based on defined operating conditions.
• In order to arrive at an accurate, physical solution, these quantities are calculated simultaneously.
• The most common CFD tools are based on the ***Navier-Stokes (N-S) equations.***

Reference

The Hindu | PraVaHa software

UNESCO State of Ocean Report 2024

UNESCO's State of Ocean report released recently on World Oceans Day highlights key knowledge gaps in research & data on spiking oceanic warming.

- **Initiated by -** The report is initiated by the Intergovernmental Oceanographic Commission (IOC-UNESCO).
- It supports for *UN Decade of Ocean Science for Sustainable Development Outcomes.*

Recent findings of the report

- Critical issues in **ocean climate regulation**, emphasizing the need for *better understanding and data to address ocean crises* and validate new carbon dioxide removal technologies.
- **Greenhouse gas emissions-** The increased *greenhouse gas emissions from human activities* have increased the uptake of the Earth's energy imbalance (EEI) by oceans.

  ***EEI** is the balance between incoming energy from the Sun and outgoing energy from the Earth.*

- **Energy and Heat Imbalance-** Oceans absorb about ***90% of the Earth's energy imbalance***, leading to increased heat content in the upper 2,000 meters.
- This inhibits ocean mixing, causing *deoxygenation, which harms marine ecosystems and coastal communities relying on oceans.*
- **Coastal Blue Carbon Habitats-** There's growing interest in *restoring coastal blue carbon habitats* like **mangroves, seagrasses, and tidal marshes to enhance carbon sequestration**.
- **Marine Carbon Dioxide Removal (mCDR)-** A rising interest in marine *Carbon Dioxide Removal (mCDR) technologies* since 2020, supported by scientific research, start-up initiatives, and substantial funding from the U.S. and EU.
- **Ocean Warming trend-** From 1960 to 2023, the upper 2,000 meters of oceans

warmed at a rate of 32 ± 0.03 W/m², accelerating to 0.66 ± 0.10 W/m² in the past two decades.
- This trend is expected to persist, leading to irreversible changes over centennial to millennial timescales.
- **Ocean Acidification-** Coastal waters can turn acidic due to natural processes, such as *freshwater influx, biological activity, temperature change and climate patterns like El Nino/Southern Oscillation (ENSO).*
- Human activities like nutrient input from agricultural and industrial activities also influence the chemistry of coastal areas.
- **Sea Level Rise -** From 1993 to 2023, the global mean sea level rose at a rate of 4 ± 0.3 mm/year.
- **Data and Research-** The report highlights a pressing need for *comprehensive and regular data to monitor ocean warming* and its *impacts, essential for maintaining healthy and resilient oceans.*

References

Down to Earth| *UNESCO's State of Ocean report*

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