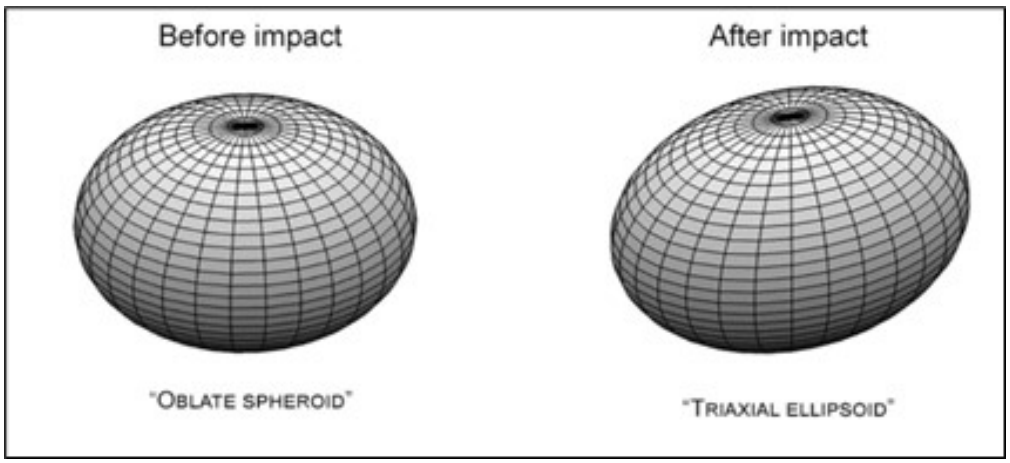
UPSC Daily Current Affairs | Prelim Bits 11-09-2024

DART Mission for Didymos & Dimorphos

A new study found that rocky debris blasted away from a football stadium-sized asteroid, Dimorphos, during the DART mission could create the 1st human-made meteor shower known as the Dimorphids.

- **Discovery -** Didymos which means "twin" in Greek was discovered on April 11, 1996, by researcher Joseph Montani of Spacewatch at Kitt Peak National Observatory in Tucson, Arizona.
- Asteroid Didymos and its small moonlet Dimorphos make up a binary asteroid system.
    - The small moon (Dimorphos) orbits the larger body (Didymos).
- They were chosen for DART mission as they pass relatively close to Earth.
- It found that the DART mission's kinetic impactor technique could effectively change an asteroid's trajectory.
- After launching of the mission it shows the impact changed not only the motion of the asteroid, but also its shape.
- The entire shape of the asteroid has changed, from a relatively symmetrical object to a ***'triaxial ellipsoid'*** – something more like an oblong watermelon.

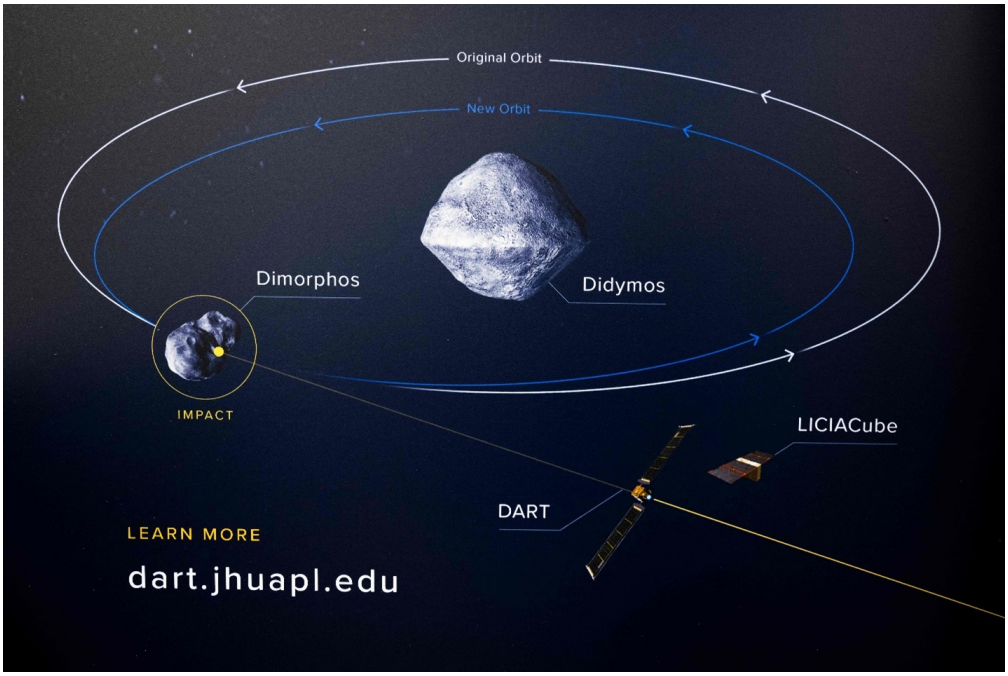


DART Mission

- **DART -** Double Asteroid Redirection Test (DART).
- **Launched by** – NASA in 2021.
- **Aim** - To test the newly developed technology that would allow a

spacecraft to crash into an asteroid and change its course.

- **Targets** - Asteroid Didymos and its moonlet Dimorphos.
- It is a part of the NASA's larger platenary defence Strategy.
- **Methodology** - It is the ***1st Kinetic Impactor Method*** of planetary defence, where a DART spacecraft will be colliding with the ***asteroid Dimorphos.***
- The Kinetic Impactor Method involves sending one or more large, high-speed spacecraft into the path of an approaching near-earth object.
- This could deflect the asteroid into a different trajectory, steering it away from the Earth's orbital path.



- **Propellant** - It has 2 solar arrays and uses hydrazine propellant for manoeuvring the spacecraft.
- **Thruster** - It also carries about 10 kg of xenon which will be used to demonstrate the new thrusters called ***NASA Evolutionary Xenon Thruster-Commercial (NEXT-C)*** in space.
    - NEXT-C gridded ion thruster system provides a combination of performance and spacecraft integration capabilities that make it uniquely suited for deep space robotic missions.
    - It's a type of electric propulsion that uses electricity to accelerate xenon propellant to speeds of up to 90,000 miles per hour.
- **Imager** - The spacecraft carries a high-resolution imager called ***Didymos Reconnaissance and Asteroid Camera for Optical Navigation (DRACO).***
- Images from DRACO will be sent to Earth in real-time and will help study the impact site and surface of Dimorphos.

Reference

Live mint | DART mission created '1st human-made' meteor shower

Curcuma ungmensis

A newly identified species of 'Curcuma,' named Curcuma ungmensis, was recently discovered by researchers in Ungma Village, located in Mokokchung district of Nagaland.

- **Genus** – Curcuma.
- **Family-** Zingiberaceae.
    - Curcuma is among the largest and most significant genera within this family, with well-known members like turmeric (Curcuma longa), black turmeric (Curcuma caesia), and mango ginger (Curcuma amada).
- **Nomenclature -** Curcuma ungmensis is named after Ungma village, where it was found.
- **Size** - It reaches heights of 65-90 cm.
- **Appearance** – It features striking yellow flowers at maturity, flowering occurs during the rainy season.
- **Habitat -** The plant thrives in ***warm, tropical*** climates.
- **Distribution -** Curcuma is extensively found throughout South and Southeast Asia, as well as in southern China. Some species can also be located in northern Australia and the South Pacific.
- In India, approximately 40 species of this genus are present, predominantly in the northeastern and southern states, along with the Andaman and Nicobar Islands.
- **Uses** - This species is a rhizomatous herb with underground stems (subterranean stem).
- The vibrant inflorescence makes it a promising candidate for use as a cut flower.
- Once domesticated, it has potential as an ornamental ground cover in gardens.

Reference

The Hindu | New species of genus Curcuma in Nagaland

Kawasaki disease

A Pediatric study recently revealed that Kawasaki disease cases among children have increased in India after COVID-19 pandemic.

- Kawasaki is a ***rare disease*** that causes inflammation of the blood vessels and a high fever that lasts for more than 5 days.
- Kawasaki Disease (KD) is sometimes called ***mucocutaneous lymph node syndrome.***
- Kawasaki disease most often affects the heart arteries in children. Those arteries supply oxygen-rich blood to the heart.
- It is one of the most common form of acquired heart disease in children.
- **Cause** - The cause of Kawasaki disease is unknown, but it may be due to an immune system reaction to a virus or a genetic link.
- **Symptoms -** A high fever, red eyes, swollen lymph nodes in the neck, a red rash on the middle of the body, a red tongue, and swollen hands and feet.
- **Vulnerable Age group** - Kawasaki disease happens most often in children 6 months to 5 years of age.
- **Contagiousness** - Kawasaki disease is ***not contagious*** and cannot be spread from one person to another
- **Complications** - Cardiovascular complications include aneurysm formation, heart failure, myocardial infarction, and valvulitis.
- **Prevention** - There is ***no way to prevent*** Kawasaki disease. But

Kawasaki disease is often treatable.

- **Treatment** - With early treatment, most children get better and have no long-lasting problems.
- **Affected countries** - It occurrs in an estimated 10 to 20 out of 100,000 children younger than age 5 in the United States and Canada.
- In Japan, Korea and Taiwan, it affects 50 to 250 out of 100,000 children younger than 5.

Recent findings

Multisystem inflammatory disease in children (MIS-C) vs Kawasaki Disease

- A recent study revealed that hyperinflammatory shock with clinical features similar to those of Kawasaki disease (KD) after COVID-19 infection in 2020.
- The World Health Organization (WHO) and U.S. Centers for Disease Control and Prevention (CDC) have named this new syndrome a ***multisystem inflammatory disease in children (MIS-C).***
- According to the study, the clinical manifestations of MIS-C overlap with those of KD, including fever, skin rashes, conjunctivitis, and mucocutaneous manifestations.
- However, MIS-C is more commonly associated with ***left ventricular dysfunction (30%–40%)*** and shock, gastrointestinal abnormalities, and neurological manifestations than KD.
- It also revealed that KD following SARS-CoV-2 infection has clinically different characteristics from conventional KD.

References

1. Financial Express | Kawasaki disease
2. Cleveland Clinic | About Kawasaki Disease

New Study on butterfly species

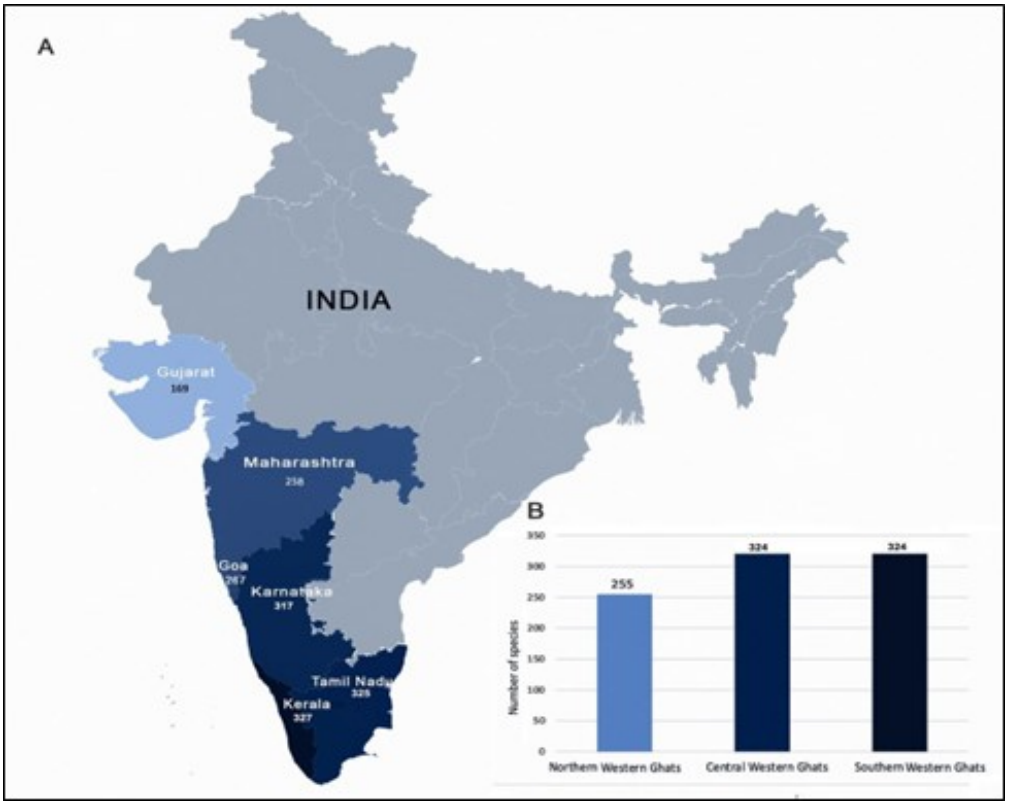
A recent study published in the Journal of the Bombay Natural History Society highlights conservation gaps and calls for reassessing conservation status of several species.

- It highlights that the diversity of butterfly species is highest in the southern Western Ghats and gradually diminishes northward.

- **Distribution**

Region	Species
Western Ghats	337 butterfly species.
Kerala	328 (highest number)
Tamil Nadu	326
Karnataka	317

- **Diversity-** The southern and central Western Ghats each have 324 species, while the northern Western Ghats have only 255 species.



- **Butterfly families-** The species belong to 6 families:
  - Papilionidae (19)
  - Pieridae (34)
  - Nymphalidae (100)
  - Riodinidae (2)
  - Lycaenidae (99)
  - Hesperiidae (83)
- **Endemic-** There are ***40 strictly endemic species*** in the Western Ghats.
- **Listed Threatened Species**
  - **IUCN Red List-** Less than 7% (22 species).
  - **Wildlife (Protection) Act-** 71 species (21%) are protected under this act with amendments up to 2022.
  - **Near threatened-** 2 species and rest as 'least concern'.

    - Common species like crimson rose, Indian common rose, and Indian tiny grass blue could be excluded from the IUCN Red List.
- **Concerns**
    - Some strictly endemic and rare species are not protected under WLPA; and
    - While certain common species are listed on the IUCN Red List, some truly threatened and rare species are not included.
- **Suggested species for WLPA inclusion-** Sahyadri green yellow, Nilgiri clouded yellow, red-eye bushbrown, Palni bushbrown, Nilgiri fritillary, and cloud-forest silverline.
- **Rare species for IUCN Red List re-evaluation-** Abnormal silverline, yellow-base flitter, Malabar banded swallowtail, and Travancore evening brown.

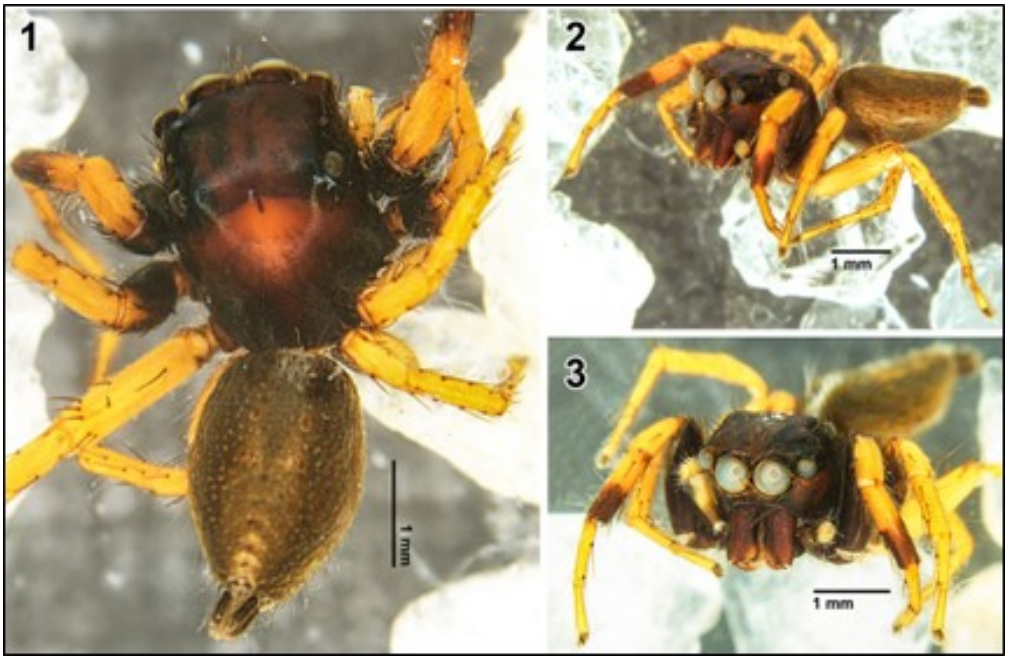
Reference

The Hindu | Study on butterfly species

Carrhotus piperus

A new species of jumping spider, Carrhotus piperus, has been identified in the lower Palani Hills of Tamil Nadu.

- **Carrhotus piperus** – It is a new species of ***jumping spider*** of genus Carrhotus Thorel.
- **Sex** – It is male carrhotus species.
- **Habitat** - Pepper (Piper nigrum) plants.
- **Piperus** – It is the specific epithet that describes the spider's distinctive pepper plant (*Piper nigrum*) habitat.
- **Unique feature** - Unique prolateral protrusion and beak-shaped embolus distinguish it from its closely-related species.



Carrhotus Thorell

• It is a jumping spider genus that was described by Thorell in 1891.
• It encompasses 36 currently valid species and with 9 known from India.
• **Number of Species** – With the new discovery , the number of *Carrhotus* species in India ***increased to 10, and to 37 globally***.
• **Distribution** - Asia, Europe, Africa, and Brazil
• **Description** - 16 described based on both sexes, 11 on males alone, and 9 on females alone.
• In India, no Carrhotus species are known solely from females.
• There are several species from Nepal, Bhutan, and Sri Lanka known only from female specimens.

Jumping Spiders

• Jumping spiders are a group of spiders that constitute the ***family Salticidae***.
• It the largest family of spiders with 13% of all species.
• As of 2019, this family contained over 600 described genera and over 6,000 described species.
• They leap great distances to move and stalk prey.
• Unlike other jumping insects that rely on large, muscular back legs, jumping spiders have a ***hydraulic system that propels*** them forward.

References

1. The Hindu | Carrhotus piperus
2. JIBS | Carrhotus Thorell, 1891

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