Prelim Bits 25-06-2022 | UPSC Daily Current Affairs

Firefly-like Robots

Inspired by fireflies, researchers from MIT have created insect-scale robots that show electroluminescence.

- These firefly-like robots weigh barely more than a paper clip, and they can be tracked using the light they emit and three smartphone cameras.
- The robots' wings are controlled by **soft actuators** or artificial muscles, which are fabricated from electroluminescent elastomer actuators.
- Using **zinc sulphate** particles, these actuators emit colored light during the flight.
- As the zinc particles only light up in the presence of a very strong and **high-frequency electric field**, a strong electric field is created in the soft actuator using high voltage.
- Then, the robot is driven at a **high frequency**, which excites the electrons in the zinc particles. Now, they emit photons - subatomic light particles.
- **Communication** - Like the fireflies, these robots are said to communicate with each other through the light-emitting feature (electroluminescence).
- **Tracking** - These robots can be flown in outdoor environments where we don't have a well-tuned, state-of-the-art motion tracking system.
- Each actuator could be tracked using cameras that can detect each light color.
- Then, a computer program tracks the position of the robots to within 2 mm of the infrared motion capture systems.
- Currently, these robots cannot turn on and off their light during flight.

Reference

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3. https://www.azorobotics.com/News.aspx?newsID=13060

VL-SRSAM

The Vertical Launch Short Range Surface to Air Missile was successfully flight-tested by the Defence Research and Development Organisation (DRDO) & Indian Navy.

- The Vertical Launch Short Range Surface to Air Missile (VL-SRSAM) is an indigenously developed **ship-borne weapon system**.
- The VL-SRSAM was developed by the Defence Research and Development Organisation (DRDO).
- It has been designed to **strike at the high-speed airborne targets** at the range of 40 km to 50 km and at an altitude of around 15 km.
- **Design** - The VL-SRSAM is an indigenous upgrade to the 2-decade-old Israeli Barak 1 surface-to-air missile system on board Indian warships.
- Its design is based on Astra missile which is a Beyond Visual Range Air-to-Air missile.

- **Features** - Two key features of the VL-SRSAM are
    1. Cruciform wings and
    2. Thrust vectoring.
- VL-SRSAM is a **canisterised system**, which means it is stored and operated from specially designed compartments.
- In the canister, the inside environment is controlled, thus making its transport and storage easier and improving the shelf life of weapons.
- **Flight** - During mid-course flight, the VL-SRSAM missile uses a fibre-optic, gyroscope-based, inertial guidance mechanism.
- With-lock-on-before-launch (LOBL) and lock on after launch (LOAL) capability; the missile receives mid-course update via datalink.
- Then, in the terminal phase, the missile switches to active radar homing.
- **Significance** - The first line of defence is provided by the Indo-Israeli Medium Range Surface to Air Missiles (MRSAMs), which are capable of shooting down hostile aerial threats at ranges out to 70 km.
- If the MRSAM fails to destroy the incoming threat at long ranges, the warship launches its VL-SRSAMs at shorter ranges of 25-30 km.

Reference

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2. https://indianexpress.com/article/cities/pune/vl-srsam-missile-system-successfully-test-fired-7989717/
3. https://www.business-standard.com/article/current-affairs/drdo-navy-successfully-test-short-range-anti-air-missile-to-protect-ships-122062401002_1.html

Endemic Fauna of Eastern Ghats

The Elvira Conservation Initiative (ECI) is organizing puppetry of fauna that are endemic to the Eastern Ghats, including and.

- The puppetry is used as a medium to create awareness about the fauna that are endemic to the Eastern Ghats, including
    1. The Indian Gaur,
    2. The Madras Hedgehog,
    3. The Elvira Rat,
    4. The endangered ornamental tarantula (Poecilotheria formosa) found in Salem; and
    5. The endemic Shevaroy Hills earth snake (Uropeltis shorttii).
- Other endemic species are the pangolins, the leopard cat, shrew, mongoose, fox, etc.,
- Very little is known about many of the Eastern Ghats species as compared to the endemic species of the Western Ghats.
- There simply isn't enough data to develop comprehensive conservation plans for species inhabiting the Shevaroy Hills and the Eastern Ghats.

Madras Hedgehog

- Bare-bellied hedgehog or Madras hedgehog (*Paraechinus nudiventris*) is an elusive animal found in Tamil Nadu.
- It is also known as mul eli (mul meaning thorn, and eli meaning rat) or irmal eli aka cough rat.
- **Habitat** - These **insectivorous mammals** have been on this land since before human evolution. It is endemic to this land.
- They are nocturnal, and have unique habitats that have only been seen in selected patches.

- They often dwell in urban landscapes, in backyards of homes in semi-arid areas of low elevation.
- Their home range is long - they keep moving and only stay in one place for long during breeding season
- Hedgehogs in the UK hibernate in winter, but the ones in South India **aestivate in summer** instead.
- **Threats** - Its population has declined drastically mainly due to habitat changes, development, illegal collection for meat, and its capture for domestication or sale.
- It is threatened by **poaching,** since its quills are used in traditional medicinal practices, or in household remedies for coughs, rheumatism and the like. Hedgehog oil is also prepared from them.
- Since it is tiny, they are **crushed under vehicles**.
- Another issue is that it isn't listed in the Wildlife (Protection) Act, 1972. So, there is less protection.

Elvira Rat

- Elvira rat (*Cremnomys elvira*) or the large rock rat is a rodent found only in the Yercaud hills.
- It is a nocturnal and fossorial (burrowing) species.
- **Habitat** - It inhabits highly specialised habitats in rocky outcrops.
- It lives in tropical dry deciduous scrub forest where it has been seen in rocky cliffs and areas.
- **Distribution** - It is found **only in the Eastern Ghats**, Tamil Nadu.
- It is known from its type locality (the place it was originally found) in of Kurumbapatti, Salem District.
- It is not found in any protected areas.
- **Threats** - The main threat to this species is a decline in habitat due to the expansion of human settlements, mining in the foothills, uncontrolled grazing in the rocky areas, etc.
- Other threats include conversion of forests, fuel wood collection, mining and dumping of debris in the foothills of small hillocks in the reserve forest, etc.
- Due to their extremely limited range, a single event such as disease, fire or other anthropogenic factors could wipe out the entire population in a very short span of time.

Protection Status	
IUCN Red List Status	Critically Endangered
Wildlife (Protection) Act, 1972	Schedule V (Vermin)

Reference

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Giant Stingray

The world's largest recorded freshwater fish, a giant stingray, has been caught in the Mekong River in Cambodia. It was captured under "Wonders of the Mekong" project, which is a joint Cambodian-US research project

Freshwater fish are defined as those that spend their entire lives in freshwater, as

opposed to giant marine species such as bluefin tuna and marlin, or fish that migrate between fresh and saltwater like the huge beluga sturgeon.

- Giant freshwater stingray (*Urogymnus polylepis*) is a species of stingray, belonging to Dasyatidae family.
- It is found throughout the large rivers and estuaries of **Borneo and Southeast Asia**.
- While this species of giant stingray has an extremely dangerous venomous barb that can reach nearly 1 foot in length, they are not usually a threat to humans.
- More often, they wind up in the market as a source of cheap protein.
- Its life history, its ecology, and its migration patterns are not known.

Mekong River

- The Mekong River is a trans-boundary river, flowing in East Asia and Southeast Asia.
- It is the longest river in Southeast Asia.

- Originating in the **Tibetan Plateau**, it runs across China, Myanmar, Laos, Thailand, Cambodia, and Vietnam.
- It drains into the **South China Sea** south of Ho Chi Minh City (Saigon).
- Vientiane (Viangchan), the capital of Laos, and Phnom Penh, the capital of Cambodia, both stand on its banks.
- The extreme seasonal variations in flow and the presence of rapids and waterfalls in the Mekong make navigation difficult.
- Mekong River is home to several species of giant freshwater fish but environmental pressures are rising.
- **Related Links** - Greater Mekong Region,

Mekong River Commission

- Mekong River Commission (MRC) is an intergovernmental organisation for regional dialogue and cooperation in the Lower Mekong River Basin.
- It was established in 1995 based on the Mekong Agreement between Cambodia, Lao PDR, Thailand and Viet Nam.
- The organisation serves as a regional platform for water diplomacy and a knowledge hub of water resources management for the sustainable development of the region.
- It works directly with the governments of Cambodia, Laos, Thailand, and Vietnam to jointly manage the shared water resources and the sustainable development of the Mekong River.

Reference

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Accredited Investors

The Securities and Exchange Board of India (SEBI) relaxed the regulatory framework for Alternative

Investment Funds (AIFs) targeting 'accredited investors'.

> AIFs that are 'large value funds for accredited investors' have been exempted from filing their placement memorandum by the SEBI.
>
> But these accredited investors have to intimate the regulator about the launch of their scheme.

- An 'accredited investor' is also called **qualified investor** or professional investor.
- They are a class of investors who have an understanding of various financial products and the risks- returns associated with them and so, are able to take informed decisions regarding their investments.
- They can be an individual or a business entity that is allowed to **trade unregistered securities** with financial authorities.
- They are entitled to this privileged access by satisfying at least one requirement regarding their income, net worth, asset size, governance status, or professional experience.
- They are recognised by many securities and financial market regulators globally.
- Sellers of unregistered securities are only allowed to sell to accredited investors, who are deemed financially sophisticated enough to bear the risks.
- Accredited Investors are considered to be capable of dealing in relatively riskier investment products due to their financial capacity and ability to absorb possible financial losses.
- In India, the 'accredited investors' are those investors with annual income of over Rs 2 crore or networth of at least Rs 7.5 crore.

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