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Z-Morh tunnel

Seven workers from APCO Infratech were killed in the militant attack on the strategic Z-Morh tunnel on the Srinagar-Sonamarg highway in Jammu and Kashmir recently.

- The Z-Morh tunnel is an ***all-weather connectivity tunnel*** connecting the Sonamarg health resort with Kangan town in central Kashmir's Ganderbal district.
- The tunnel has acquired its name for the Z-shaped road stretch at the place where the tunnel is being constructed.
- **Altitude -** The stretch where the tunnel is under construction is situated at an altitude of over 8,500 feet, and is prone to snow avalanches in the winter.
- **Constructed by -** The tunnel project was originally conceived by the Border Roads Organisation in 2012.
- However, the project was later taken over by the National Highways & Infrastructure Development Corporation Limited (NHIDCL).
- The NHIDCL retendered the tunnel project to APCO Infratech, which executed the project through a special purpose vehicle, APCO-Shri Amarnathji Tunnel Private Limited.
- The tunnel project is almost complete, its inauguration was delayed by the Model Code of Conduct (MCC) in place because of the Jammu and Kashmir Assembly elections.
- **Significance -** The Z-Morh tunnel is ***part of the Zojila tunnel project,*** which will connect Sonamarg in Kashmir with Drass in Ladakh, is ongoing and expected to finish by December 2026.
- Thus providing all-weather access to Sonamarg, the tunnel is vital for ensuring year-round connectivity to Ladakh.
- This is particularly important for the movement of military personnel to border areas.
- The Z-Morh tunnel is also important for the success of the Zojila tunnel project, which is situated at an altitude of approximately 12,000 ft.

References

1. The Indian Express | Z-Morh project
2. Business Standard | Z-Morh tunnel project

Moonlight program

The European Space Agency (ESA) at the International Astronautical Congress, launched its Moonlight Lunar Communications and Navigation Services (LCNS) program recently.

- Moonlight program is the ***Europe's first-ever dedicated satellite constellation*** for

telecommunication and navigation services for the Moon.

- **Aim -** To offer coverage at the Moon's South Pole, an area suitable for future operations due to its advantageous terrain.
- **Agency** – Moonlight Lunar Communications and Navigation Services (LCNS) program is a partnership project between
    - ESA and an industry consortium led by space systems developer Telespazio, with support from the UK and Italian Space Agencies.
- **Features -** The program will have a constellation of about 5 lunar satellites (1 for high data rate communications and 4 for navigation) that allow accurate autonomous landings, high-speed communication, and surface mobility.
- These satellites will reportedly enable data transfer over 2,50,000 miles or 4,00,000 kilometres between the Earth and the Moon.
- **Duration** - The first step will be the launch of Lunar Pathfinder, a communications relay satellite built by Surrey Satellite Technology LTD, in 2026.
- The initial services of the programme will reportedly begin by the end of 2028, and the system is said to be fully operational by 2030.
- Moonlight will comply with LunaNet's standards and undergo the first-ever lunar navigation interoperability tests, scheduled for 2029.

*The ESA is working with NASA and the Japanese space Agency JAXA on **LunaNet,** which is essentially a framework to standardise communication and navigation for the Moon.*

References

1. The Indian Express | Moonlight programme
2. ESA | Moonlight programme

Chug Valley

Chug valley, once blanketed by Cosmos flowers, has begun to shrink, and the meadows are no longer as dense as they used to be due to excessive human interference.

- The Chug Valley is in the Dirang region of ***Arunachal Pradesh***, with sprawling green grasslands.
- **Vegetation** - It encompasses green hills, vast meadows, and towering pine trees amidst majestic Himalayan peaks.
- **Community -** Duhumbi Monpa community is a community in the Chug village.
- **River -** The Dihing River, flowing through the region.
- **Cosmos flowers -** The valley showcases an enchanting beauty with a sea of pink and white Cosmos flowers during September and October months.
- Cosmos flowers act as pests repellant. They repel the corn earworm (Helicoverpa zea), which is a threat to food crops.
- Cosmos are native to Southern and Central America with Asteraceae family.
- These flowers attract butterflies, bees and other pollinators that are essential for a

healthy environment besides offering food to birds, freshwater fish and other wildlife.
- They are grown easily from seeds and will even survive in poor soil conditions.
- Cosmos are also tolerant of most soil pH levels but grow best in neutral to alkaline soils (pH of 7.0-7.5).
- **Awards -** In 2024, Chung Valley was awarded
    - The 2nd Best Tourism Village Award and
    - Dammu's Heritage Dine of Chug Village was awarded the Responsible Tourism Award by the Government of Arunachal Pradesh.

Reference

Arunachal observer | Chug Valley

Nilgiri tit butterfly

Butterfly enthusiasts from the Nilgiris have recorded for the first time in India, the Nilgiri tit (Hypolycaena nilgirica) utilising a large terrestrial orchid plant as a host.

- It is a rare, endemic butterfly an uncommon species of lycaenid or blue butterfly.
- **Scientific Name -** Hypolycaena nilgirica.
- **Appearance** - The male has a dark reddish purple-brown upper side with characteristic black spots capped in orange near its tails, while the female is pale brown.
- It has tapering patches of white dustings above the black spots and in the adjacent interspaces.



- **Behavior** - Males engage in mud sipping. Their flight is moderately fast and they visit

flowers in hedges. They bask in the morning, but do not open their wings otherwise.

- **Habitat** - They inhabit forests and lush home gardens, especially those with orchids.
- **Distribution** – It is found in Western Ghats and Sri Lanka.
- **In India –**
  - **Tamil Nadu** - Geddai slopes of Nilgiris district,
  - Aiyannar Falls of Virudhunagar district,
  - Anamalais of Coimbatore district
  - Kalakkad Mundanthurai Tiger Reserve of Tirunelveli district
  - **Kerala-** Chinnar Wildlife Sanctuary of Idukki district, and
  - Silent Valley National Park of Palakkad district
- The Nilgiri tit was noted to lay its eggs on the inflorescence (complete flower head) of the larval host plant, ***Eulophia epidendraea***, a terrestrial orchid species.
  - This terrestrial orchid was found on rocky slopes in humid areas.
  - Eulophia epidendraea was mainly associated with grasses such as Cymbopogon flexuosus, Chrysopogon nodulibarbis, Melinis repens, among other floral species.
- **Conservation status -** Schedule II of the Wildlife Protection Act. It is not listed on the IUCN Red List of Threatened Species.

Reference

The Hindu | Nilgiri tit (Hypolycaena nilgirica)

Clostridioides difficile bacteria

Researchers are developing the 1st successful vaccine against Clostridioides difficile bacteria, using the technology behind the revolutionary mRNA vaccines that tackled COVID-19.

- It is a bacterium highly contagious and difficult-to-treat and can cause severe diarrhea and even deadly colon damage.
- **Symptoms**
  - **Common** - Watery diarrhea, fever, nausea, abdominal pain
  - **Severe -** Severe cramping, loss of appetite, weight loss, dehydration, rapid heart rate
  - **Life-threatening** - Pseudomembranous colitis, toxic megacolon with septic shock

C. diff is the leading cause of antibiotic-associated diarrhea worldwide.

- **Vulnerables** - It can affect anyone, but most cases occur after taking antibiotics or shortly after finishing them.
- **Transmission** - C. diff can also spread from patient to patient, or through contaminated hands or the environment.
- C. diff can live in the intestines of humans and animals, and in the environment, especially where infected people and animals live.

- It can enter the body through the mouth, and reproduce in the small intestine.
- In the colon, the bacteria can release toxins that damage tissues and cause diarrhea.
- Roughly one-third of infected individuals will have recurrent infections.
- **Treatment -** C. diff can usually be treated with another course of antibiotics.
- **Recent advancement in treatment -** Like the COVID vaccines, the ***C. difficile mRNA vaccine*** uses genetic material from the bacteria to train the immune system to recognize and respond in the event of future infections.
- Immune cell responses increased with vaccine dose and were significantly higher than with more traditional vaccines.
- Mice vaccinated with traditional-style vaccines all died within a day after being infected with the bacteria.
- Adding a booster to the old-style vaccines improved survival by 20%, but immunization with the mRNA vaccine improved survival to 100%.

Reference

DD News | C. difficile

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