Complex Communication System among Sperm Whales

Prelims: *Current events of national and international importance | Environment*

Why in News?

Scientists using artificial intelligence (AI) have uncovered a complex communication system among sperm whales, identifying a kind of phonetic alphabet.

- Sperm whales are ***highly social, deep-diving marine mammals*** that live in close family units.
- Sperm whales living in the ***eastern Mediterranean Sea*** have developed a distinct regional dialect that separates them from populations living in the west.
- **Analysis led by -** Project CETI (Cetacean Translation Initiative).

  Project CETI is to cross-reference the newly discovered phonetic building blocks with observed physical behaviours.

- **Acoustic labels –**
  - **Codas -** While hunting for prey like giant squid thousands of feet below the surface, they maintain constant contact by emitting rapid bursts of clicks called codas.
  - Historically, scientists viewed these sounds as basic acoustic labels.
  - The computer models identified that the animals alter their vocalizations through specific structural adjustments.
  - **Rubato -** Whales deliberately manipulate the tempo and rhythm, a feature researchers called rubato.
  - They also frequently append an extra click to the end of a sequence, termed ornamentation.
- While Caribbean whales are demonstrating how complex these basic linguistic blocks can be, sperm whales in the Mediterranean Sea shows how these sounds change over geographical distances.

- Scientists believed all of these whales used an identical vocal signature known as the ***3+1 coda***, consisting of 3 rapid clicks, a brief pause, and a final 4th click.
- Whales living in the western Mediterranean, near Spain's Balearic Islands, strictly maintain the traditional 3+1 pattern.
- However, the population residing in the eastern Mediterranean, near the Hellenic Trench off Crete, utilizes a sped-up version of the exact same sequence.
- The precise meaning of the 156 Caribbean codas and the underlying purpose of the Mediterranean dialect shift remain unknown.
- **Modern threats –** Hunting, ship strikes, entanglement in heavy commercial fishing gear, rising ocean noise levels, and changing marine ecosystems driven by climate change.
- **Conservation -** Unlocking their communication system could alter how human conservation programs protect these vulnerable populations.

Reference

Times of India | Sperm Whales vocalization

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