TARDIGRADES: SPEICES OF THE DAY

Detailed 3D images of the first tardigrade fossils ever discovered help scientists predict when tardigrades evolved their near-indestructibility — a trait that might have helped them survive multiple mass extinctions.

What Are Tardigrades?

- Tardigrades are commonly known as **water bears or moss piglets.**
- They are **microscopic, aquatic animals that have the ability to survive some of the harshest conditions on Earth** (extreme temperatures, radiation, and even the vacuum of space)**.**
- These were discovered in 1773 by German zoologist Johann August Ephraim Goeze.
- They earned the nickname **"little water bears" due to their resemblance to tiny, plump, segmented animals.**
- There are around 1**,300 known species of tardigrades**.
- They range from 0.002 to 0.05 inches in size.

Habitat

- Tardigrades thrive in **diverse environments, from oceans to droplets of water on plants.**
- They **can live in extreme locations such as the Himalayas and deep ocean trenches.**

Diet

- Most tardigrades feed on plant cells, algae, and fungi by piercing the cells and sucking up their contents.
- Some species can consume smaller creatures, such as nematodes and rotifers.

Survival in Extreme Conditions

- This is primarily due to a **unique survival strategy called cryptobiosis.**
- In this state, **they expel more than 95% of the water from their bodies, retract their head and legs, and curl into a dehydrated ball known as a tun.**
- In this form, tardigrades nearly stop their metabolism.
- Tardigrades can remain in their tun state for decades, possibly even a century, before reviving once conditions become favorable again.
- Tardigrades produce unique proteins that protect their cells during cryptobiosis.
- When they expel water from their bodies, these proteins form a glass-like structure around the cells, ensuring protection until they can rehydrate.

- **Tardigrades' ability to survive extreme conditions has allowed them to endure all five mass extinctions on Earth.** Their resilience suggests they could outlive many other species, including humans.

Category	Description
Definition	Invertebrates are animals that lack a vertebral column (backbone or spine).
Characteristics	Soft-bodied (some with exoskeletons) Diverse body structures and functions
Major Groups	Arthropods (Insects, spiders, crabs) Mollusks (Snails, clams, octopuses) Annelids Cnidarians Echinoderms Nematodes
Habitat	Found in nearly all environments: oceans, freshwater, terrestrial (land), and even extreme environments
Size Range	From microscopic (e.g., rotifers) to several meters long (e.g., giant squid)
Respiratory System	Varies by group: gills (e.g., mollusks), tracheae (e.g., insects), diffusion through the body surface
Circulatory System	Open circulatory system (e.g., arthropods, mollusks) Closed circulatory system (e.g., annelids)
Nervous System	Varies by group: simple nerve nets (e.g., cnidarians) to more complex systems with a brain (e.g., arthropods)
Symmetry	Bilateral (e.g., arthropods, mollusks) Radial (e.g., echinoderms, cnidarians)
Importance	Ecological roles (pollinators, decomposers) ●Source of food (e.g., seafood) ●Medical research