

## Influenza viruses

- The study found that influenza viruses can infect all classes of fish, and Siberian sturgeon (*Acipenser baerii*) may have served as early, if not the first, hosts of influenza virus before it spilled over into mammals
- The virus in the Articulavirales order “utilises a large repertoire of transmission routes”. If the influenza virus spreads via respiratory droplets in the case of mammals and faeces among birds, the transmission of the virus from one fish to another is thought to be through the respiratory route.



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## Phytoplankton

- Phytoplankton blooms increase in size in 21st century
- Coastal phytoplankton blooms increased in both their size and their frequency between 2003 and 2020 (Nature). Researchers created a comprehensive map of bloom distribution and trends by assessing 7,60,000 satellite images
- The total bloom affected area in 2020 was 31.47 million sq km (8.6% of the global ocean area).
- This was an increase of 3.97 million sq km (13.2%) from 2003. The global median frequency also showed an increasing rate of 59.2% over the observed period.

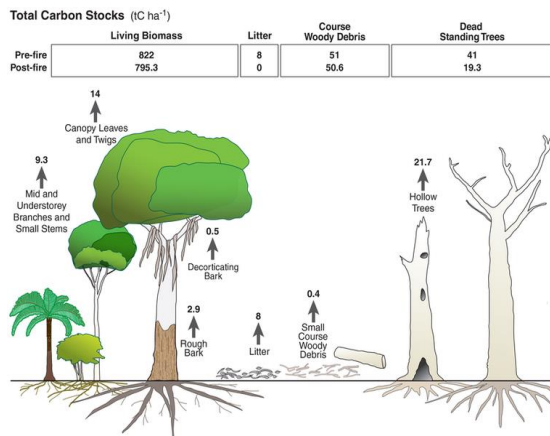
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## Carbon stock

- Carbon stocks of trees in Africa were overestimated
- An inventory of 10 billion trees in semi-arid sub-Saharan Africa provides estimates of the amount of carbon stored in this ecosystem (Nature).
- Researchers have assessed over 9.9 billion trees in Africa, covering 1,00,00,000 sq km of land.

- The average carbon stock for a single tree is 51 kg of carbon (kg C) in the hyper-arid, 63 kg C in the arid, 72 kg C in the semi-arid, and 98 kg C in the sub-humid zone. Earlier attempts have overestimated the carbon stocks of trees.



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### FOLDSCOPE

- Researchers from the Indian Institute of Science (IISc) have reported that a cheap microscope connected to a smartphone camera could find wider application in many areas, and in some cases potentially replace more expensive equipment
- The Foldscope is a handheld microscope made mostly of paper that can be connected to a smartphone camera
- It was created by the Stanford University researchers in 2014 and costs around ₹400.

- The researchers found that foldsopes could capture the roundness and aspect ratio of an object to within 5% of those captured by state-of-the-art instruments called scanning electron microscopes (SEM), which cost more than ₹50 lakh each.
- A Foldscope is an optical microscope that can be assembled from simple components, including a sheet of paper and a lens.
- It was created by Manu Prakash and designed to cost less than one USD to build.
- It is a part of the "frugal science" movement which aims to make cheap and easy tools available for scientific use in the developing world.

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### Electron microscope

- An electron microscope is a microscope that uses a beam of accelerated electrons as a source of illumination.
- As the wavelength of an electron can be up to 100,000 times shorter than that of visible light photons, electron microscopes have a higher resolving power than light microscopes and can reveal the structure of smaller objects.

- Scrub typhus a life-threatening infection caused by *Orientia tsutsugamushi* bacteria is a major public health threat in South and Southeast Asia
- What makes scrub typhus a major public health threat is the very high mortality rate in patients with the severe disease despite diagnosis and treatment.



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### **Scrub typhus-Monotherapy vs combination therapy**

- Monotherapies using either doxycycline or azithromycin were the commonly used treatment
- Scrub typhus is transmitted to humans by bites from tiny infected larvae of mites; mites breed during July-March. Only the larval stage of the mite requires a blood meal, which is usually from rodents.
- In the monotherapy group, only patients treated with a single antibiotic drug were included,

whereas in the combination therapy group patients treated with two or more antibiotics given simultaneously were included

- “The larvae are invisible to the naked eye and the bite is not painful. So people don’t realize they have been bitten by an insect and possibly infected.

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