Fungicide Driving Candida tropicalis Drug Resistance

Prelims: Current events of national and international importance

Why in news?

Recently researchers from Fudan University, Shanghai discovered that the use of agricultural fungicide tebuconazole is linked to increasing azole-resistant C. tropicalis infections.

- **About Candida tropicalis –** It is an important fungal pathogen in India and globally and it can cause **serious illness**, especially in people with weak immunity.
- It causes severe infections with 55-60% mortality rate.
- **Treatment** – It is treated using antifungal drugs from the **azole group**, especially fluconazole and voriconazole.
- **Recent Findings –** Many strains (types) of *Candida tropicalis* are becoming resistant to these medicines.
- This means the medicines are not working as effectively, making the infection harder to treat.
- Tebuconazole is structurally similar to medical azoles and accumulates in the environment, promoting resistant strains.

Mechanism of Resistance

- A **fungicide** called **Tebuconazole** is widely used by farmers to protect crops.
- This fungicide belongs to the same chemical family (Azoles) as the medicines used for treatment.
- Over time, the fungus gets **used to** this chemical in the environment, and develops **resistance**.
- This resistance makes the fungus stronger and harder to kill with medical drugs.
- When *Candida tropicalis* is exposed to tebuconazole, it undergoes **genetic changes** called **aneuploidy**.

Aneuploidy means the fungus changes its number of chromosomes (genetic material), which helps it survive the chemicals.

- These changes make the fungus more resistant to medical drugs like fluconazole and voriconazole and more dangerous and harder to treat.
- **Implications –** Overuse of such fungicides in farming can lead to more drug-resistant infections in humans.
- These infections are harder to treat, can spread, and increase health risks.
- The situation is an example of how what happens in agriculture can affect human health directly.
- Study reinforces the One Health principle where agricultural practices impact human

health.
- It highlights need for,
    - Regulating agricultural fungicide use.
    - Monitoring environmental reservoirs of drug resistance.
    - Global cooperation to combat emerging fungal threats.

Reference

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