

Xoo Infection: Rice

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In News

- Scientists from the Centre for Plant Molecular Biology (CPMB) have uncovered the mechanism by which bacterium called Xoo causes disease in rice plants.

Key Points

About Xoo

- *Xanthomonas oryzae* pv. *oryzae* (Xoo) causes a serious bacterial leaf blight disease in rice. It is also known as Bacterial blight.
- Xoo is a gram-negative bacteria.

Transmission

- Xoo infection causes huge yield losses to rice cultivation throughout the world.
- Xoo infection initiates from the leaf sheath and eventually spreads to mature leaves through the water flow under optimum temperature and high humidity conditions (Vascular disease).

Prevention

- The most-common method of defending against rice bacterial blight is the cultivation of rice varieties with genes that confer resistance to Xoo infection.
- Over 30 resistance genes, termed Xa1 to Xa33, have been identified in rice plants, and some, such as Xa21, have been integrated into the genomes of commercial rice strains.
- However, this method involves breeding or gene manipulation techniques that are laborious and time-consuming.

- Also, the introduced resistance genes provide only race-specific resistance that will prevent infections by only specific strains of Xoo.
 - Since rice paddies are flooded throughout most of the growing season, Xoo may easily spread among crops; bacteria travel through the water from infected plants to the roots and leaves of neighbouring rice plants.
 - Wind may also help spread the Xoo bacteria to other crops and rice paddies.

New Approach

- Scientists are working to identify and develop a few molecules which are derived either from the Xoo bacterium or from the infected rice cell walls.
- Treatment of rice with cellulase, a cell wall degrading enzyme secreted by Xoo induces rice immune responses and protects rice from subsequent infections by Xoo.

Centre for Plant Molecular Biology

- CPMB is one of the 7 Centers of Excellence created in the country with initial financial assistance from the Department of Biotechnology, Government of India.
- Currently it is one of the leading Centers of the country in Plant Molecular Biology (study of molecular basis of plant life).