



Integrated Plant Disease Management (IPDM): A Comprehensive and Sustainable Approach to Plant Disease Control

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IPDM involve management systems which utilize compatible combinations of all the available techniques to keep the pathogen population below the economic threshold level (ETL) which would not result in economically unacceptable damage to the crop. IPDM is based on five principles of plant disease management and integrates multidisciplinary approaches for the management of plant diseases.

Main components of IPDM

- **Cultural Practices:** Methods like crop rotation, sanitation, and intercropping to prevent disease spread.
- **Regulatory Measures (Quarantine):** Preventing the introduction and spread of pathogens through regulation.
- **Chemical Methods:** Judicious use of fungicides and pesticides to control diseases.
- **Biological Methods:** Use of natural enemies, such as beneficial fungi and bacteria, to suppress pathogens.
- **Physical Methods:** Employing practices like solarization or hot water treatment to eliminate pathogens.
- **Genetic Engineering:** Developing resistant crop varieties through genetic modification.

Main strategies of IPDM

1. Need based application of pesticides
2. Encouragement and enhancement of biocontrol agents
3. Use of resistant or tolerant cultivars of plants
4. Modification of cultural practices
5. Use of any other strategies that interrupts host-pathogen interactions

Advantages of IPDM

1. Avoids chemical pollution of soil, water, air and food products
2. Avoids development of resistance in the plant pathogens against fungicides
3. It is an eco-friendly strategy for management of plant diseases
4. It is an economically feasible approach
5. It is a multipronged strategy for efficient management of plant diseases

Therefore, IPDM utilizes all suitable strategies in a compatible manner to reduce and maintain pathogen populations at levels below those causing economic losses.

Rice diseases and IPDM

Fungal diseases

1. Blast: Foliar disease and the pathogen survives on collateral hosts
2. Brown spot of rice – Seed borne and a foliar disease

3. Sheath rot, sheath blight, foot rot and stem rot – Soil borne diseases
4. False smut – seed borne disease

Bacterial diseases: Bacterial leaf blight and bacterial leaf streak – Seed borne and survives on collateral hosts and weeds

Viral or Phytoplasmal diseases: Rice tungro virus, Rice yellow dwarf – Survives on weeds and dissemination is by insect vectors

IPDM strategy in rice

1. Selection of healthy seed
2. Selection of resistant cultivars
3. Removal and destruction of collateral hosts
4. Balanced fertilization
5. Rouging of diseased plants
6. Seed treatment with carbendazim or tricyclazole at 2g/Kg seed
7. Need based foliar application of carbendazim@0.1% or Tricyclazole@0.06% for the management of blast.
8. Need based foliar application of validamycin for the management of sheath blight and sheath rot.
9. Soil application of carbofuran granules or foliar spray of any systemic fungicide is followed to manage insect vectors, thereby decreasing the spread of viral diseases.

Sugarcane diseases and IPDM

1. Red rot – sett borne disease which spreads through irrigation water
2. Whip smut - sett borne and disseminate through wind borne sporidia
3. Pine apple disease, sett rot – Sett borne disease
4. Grassy shoot – Vector borne Phytoplasmal disease
5. Ratoon stunting – Sett borne (*Clavibacter xyli*)
6. Sugarcane mosaic – Survives on weeds and disseminated by insect vectors

IPDM in sugarcane

1. Collection and destruction of infected crop debris
2. Hot water treatment of setts (52⁰C for 30 min)
3. Hot air treatment of setts (54⁰C for 2-3 hrs)
4. Balanced irrigation and fertilization
5. Avoid selection of seed material from Ratoon crop
6. Need based spray of systemic insecticides to minimize the spread of viral and Phytoplasmal diseases
7. Selection of disease resistant or tolerant cultivars