False Smut of Rice

Occurrence and distribution
False smut disease of rice is also known as ‘Lakshmi disease’ because occurrence of this disease was recognized as a symbol of bumper harvest. In the recent years the disease has emerged as one of the most devastating grain disease. In India the disease has been observed in severe form since 2001 in major rice-growing states viz., Haryana, Punjab, Uttar Pradesh, Uttaranchal, Bihar, Jharkhand, Gujarat, Maharashtra, Jammu and Kashmir, West Bengal, Tamil Nadu, Karnataka, Andhra Pradesh, and Puducherry.

Economic importance
The disease causes both quantitative and qualitative losses. The losses in grain yield occur due to chaffiness, reduction in test weight and sterility of the spikelets neighbouring smut balls. The yield losses have been estimated to vary between 0.2 - 49% in different states of the country. The chlamydospores also contaminate the rice grains and straws with their antimitotic cyclic peptides, which are poisonous to both human and animals.

Symptoms
Symptoms produced are visible after flowering only, where the fungus infects the young ovary of the individual spikelet and transforms them into large, velvety green balls (smut ball) (Fig. 1).

Pathogen
The disease is caused by a fungus Ustilaginoidea virens (Fig. 2). U. virens produces both sexual (sclerotia) and asexual (chlamydospores) stages in its life cycle. Sclerotia are the major source of primary inoculum. In nature, over wintered sclerotia germinate and produce ascospores and coincides with the anthesis of early sown rice crop. Such ascospores lodge on the floral parts and initiate infection. Air-borne chlamydospores play an important role in the secondary infection which is a major part of disease cycle.

Factors favouring the disease
High relative humidity, low temperature and rainfall accompanied by cloudy days during flowering favored disease. The number of rainy days during flowering period influenced the disease incidence more than the amount of rain fall.

Application excessive dose of nitrogenous fertilizer particularly at flowering stage also play important role in increasing the susceptibility of the plant against false smut.

Toxin
U. virens produces a toxin, known as Ustiloxin. Ustiloxins are unique tetrapeptides and Ustiloxins A–F were isolated from the water extracts of false smut balls. The toxins cause mycotoxicosis and inhibit the polymerization of brain tubulin at micromolar concentrations.

Management

- Sowing date and heading period of rice could be planned to escape severe damage.
- Avoid sclerotia and chlamydospore infected seeds for sowing.
- Spraying of chlorothalonil 75 WP (Kavach) @ 2 ml/l or Propiconazole 25 EC (Tilt or Result) during flowering reduce the disease incidence.
- Cultural practices like bunds and fields cleaning reduce the incidence as the disease has been reported on some of the weeds.

Alternate hosts
The pathogen also survives through alternate host viz., barnyard grass (Echinochloa crusgalli), Imperata cylindrical, and common rice weed Digitaria nigritata.

For more Information contact: Visit Rice Knowledge Management Portal [http://www.rkmp.co.in]
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