

Rice False smut Disease and Its Integrated Management

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I. About the Disease

Hindi Name: हल्दी रोग (Haldi Rog); कंडुआ रोग (Kandua Rog); आभासी कांगियारी रोग (Abhasi Kangiyari Rog).

Odia Name: ସାଆରା ରୋଗ (Saara Roga).

False smut is an important fungal disease emerged as a major challenge for rice cultivation in the recent years. The incidence of the disease is more in all the rice growing states like Haryana, Punjab, Uttarakhand, Bihar, Chhattisgarh, Gujarat, Jharkhand, Odisha, Karnataka, Andhra Pradesh, Telangana, Kerala, Tamil Nadu, Assam, West Bengal, Uttar Pradesh, Himachal Pradesh, Jammu and Kashmir. The disease caused yield losses of rice by 2.8–81% depending on the disease intensity, weather conditions and varieties. The disease causes reduction in grain quality, and also produces deadly mycotoxins poisonous to human and livestock.

II. Disease symptoms

- False smut is visible only after panicle exertion.
- Few grains in a panicle or all the grains gets infection based on favorable conditions.
- It can infect the plant during flowering stage.
- Plants infected with false smut have individual rice grain transformed into a mass of spore balls (yellow fruiting bodies).
- The velvety spores grow profusely and cover entire floral parts.
- Later, the yellowish smut ball turn to greenish colored velvety appearance.
- The size of the smut ball is generally 1 cm.
- These spore balls are initially orange, and then turn into greenish black when these mature.
- Entire field looks like black dusty colored due to breakage of smut balls and mix in air.
- The disease is very severe medium slender grains. But, the severity may also observe more in other varieties also.



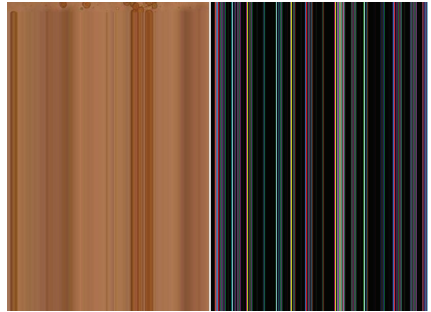
Conversion of individual grains into smut balls
(Initial stage with yellow smut ball)



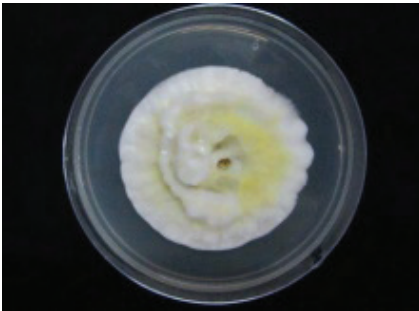
Majority of the grains infected (Yellowish balls
turning to green velvety sori)



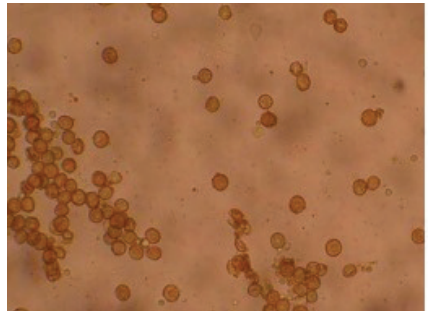
Mature smut balls turning to black sori (Advanced
Infection)



Severely infected panicle



Pathogen growth on Potato Sucrose Agar Medium



Conidia of *Ustilaginoidea virens* as seen under a
compound microscope

III. Pathogen

- The disease is caused by *Ustilaginoidea virens* (Cooke) Takahashi (teleomorph: *Villosiclava virens*).
- The pathogen produces poisonous mycotoxins namely ustiloxins and ustilaginoindins
- The mature sclerotia fall into soil, remains there and germinate to produce ascospores serves as primary inoculum.

- Chlamydospores are formed in the grains as spore balls which are elliptical to spherical, and olivaceous.
- Airborne smut spores are responsible for secondary spread.

IV. Economic thresh hold level (ETL)

Lesions of 5-6 mm in length & 2-3 infected plants/m²

V. Critical Stages of Infection

Booting to Flowering

VI. Favorable conditions for disease incidence

- High rainfall and Relative humidity (>95%).
- Air temperature of 25-35 °C
- High application of nitrogen fertilizer during flowering.
- Late planting of the crop leads to severe disease incidence (August).
- Strong wind helps in dissemination of the spores from infected field to healthy field.
- Presence of overwintering fungus as sclerotia and chlamydospores.
- The pathogen also survives through alternate host viz., barnyard grass (*Echinochloa crusgalli*) and common rice weed *Digitaria marginata*.

VII. Management Practices

- Follow summer ploughing and crop rotation strictly.
- Use healthy seeds/avoid seed contaminated with smut balls/sclerotia.
- Seed treatment with Carbendazim 50% WP @2g/kg of seeds.
- Early planting escapes disease incidence (July 1st to 4th Week).
- Plant resistant varieties like CRS-30, Gayatri, Panidhan, Savitri, Sitabhog, Pankaj, Sabarmati, Saket-4, Sona, Surya, Vijaya, Jayanti, IR 22, IR 26, and IR 28.
- Drain out excess water from the field after grain formation.
- Fungicides like Copper hydroxide 77% WP @1.25kg/ha, or Propiconazole 25% EC @2 mL/liter, or Chlorothalonil 75% WP @ 2 mL/litre or Carbendazim 50% WP @ g/litre.

VIII. List of chemical fungicides approved for management of paddy blast.

Fungicides	Commercial formulations available in market	Dosage/ha			Waiting period from last application to harvest (Days)
		a.i (g)	Formulations (g/ml) %	Dilution in Water (L)	
Copper hydroxide 77% WP	Kocide	1000g	2000g	750	30
Carbendazim 50% WP	Bavistin, Benfil, Dazim, Goldstin, Savistin, Carwell, Carzimchem, Avistin, Commando, Carry, Conika	1g/kg of seeds	500	500	
Hexaconazole 5% EC	Contaf, Contaf Plus, Green Taf, Confort Plus, Hexarin Plus, Hexon, Sitara Plus, hexadhan Plus,	50g	1000mL	500	40
Fluopyram 17.7% SC+Tebuconazole 7.7% w/w SC	Luna Experience, Udan				
Picoxystrobin 7.05% + Propiconazole 11.7% SC	Galileo, Picozole way,	200	1000	500	24
Thiifluzamide 15% + Difenconazole 20% SC	Rule, Habiki	37.50+50	250	500	27
Tricyclazole 20.4% w/w + Azoxystrobin 6.8% w/w SC	Traizoxy, Defeater	225+75	1000	500	10
Tricyclazole 18.0% w/w +Tebuconazole 14.4% w/w SC	Tik Tok, Tim Tom	200+160	1000	500	44

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