

Diseases of Sorghum

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1. Downy Mildew - *Peronosclerospora sorghi*

Symptoms: The fungus causes systemic downy mildew of sorghum. It invades the growing points of young plants, either through oospore or conidial infection. As the leaves unfold, they exhibit green or yellow colouration. Abundant downy white growth is produced on the lower surface of the leaves, which consists of sporangiophores and sporangia.



Normally three or four leaves develop the chlorotic downy growth. Subsequent leaves show progressively

more of a complete bleaching of the leaf tissue in streaks or stripes. As the infected bleached leaves mature they become necrotic and the interveinal tissues disintegrate, releasing the resting spores (oospores) and give the typical shredded leaf symptom.

Favourable Conditions:

- ❖ Maximum sporulation takes place at 100% R.H.
- ❖ Optimum temperature for sporulation is 21-23°C during night.

Management:

- ❖ Crop rotation with other crops viz., pulses and oilseeds.
- ❖ Avoid the secondary spread of the disease by roguing out the infected plants since the wind plays a major role in the secondary spread of the disease.
- ❖ Grow moderately resistant varieties.
- ❖ Seed treatment with Metalaxyl at 6 g/kg of seed.
- ❖ Spray Metalaxyl 500 g or Mancozeb 2 kg or Ziram 1 kg or Zineb 1kg/ha.

2. Rectangular Leaf spot - *Cercospora sorghi*

Symptoms: The symptoms appear as small leaf spots which enlarge to become rectangular lesions on the leaf and leaf sheath. Usually, the lower symptoms leaves are first attacked. The lesions are typical dark red to purplish with lighter centers. The lesions are mostly isolated and limited by veins. The colour of the spots varies from red, purple, brown or dark depending upon the variety.

Favourable Conditions:

- ❖ Cool moist weather.
- ❖ High humidity (90 per cent)
- ❖ High rainfall.

Management:

- ❖ Use disease free seeds.
- ❖ Treat the seed with Captan or Thiram at 4 g/kg.
- ❖ Spray Mancozeb 2 kg /ha.

3. Anthracnose and red rot - *Colletotrichum graminicolum*

Symptoms: The fungus causes both leaf spot (anthracnose) and stalk rot (red rot). The disease appears as small red coloured spots on both surfaces of the leaf. The centre of the spot is white in colour encircled by red, purple or brown margin.



Numerous small black dots like acervuli are seen on the white surface of the lesions. Red rot can be characterized externally by the development of circular cankers, particularly in the inflorescence. Infected stem when split open shows discoloration, which may be continuous over a large area or more generally discontinuous giving the stem a marbled appearance.

Favourable Conditions:

- ❖ Continuous rain.
- ❖ Temperature of 28-30°C.
- ❖ High humidity.

Management:

- ❖ Treat the seeds with Captan or Thiram at 4 g/kg.
- ❖ Spray the crop with Mancozeb 2 kg/ha.

4. Rust - *Puccinia purpurea*

Symptoms: The fungus affects the crop at all stages of growth. The first symptoms are small flecks on the lower leaves (purple, tan or red depending upon the cultivar). Pustules (uredosori) appear on both surfaces of leaf as purplish spots which rupture to release reddish powdery masses of uredospores. Teliopores develop later sometimes in the old uredosori or in teliosori, which are darker and longer than the uredosori. The pustules may also occur on the leaf sheaths and on the stalks of inflorescence.



Favourable Conditions:

- ❖ Low temperature of 10 to 12°C favours teliospore germination.
- ❖ A spell of rainy weather favours the onset of the disease.

Management:

- ❖ Remove the alternate host.
- ❖ Spray the crop with Mancozeb at 2 kg/ha.

5. Grain smut/Kernel smut / Covered smut / Short smut - *Sphacelotheca sorghi*

Symptoms: The individual grains are replaced by smut sori. The sori are oval or cylindrical and are covered with a tough creamy skin (peridium) which often persists unbroken up to thrashing. Ratoon crops exhibit higher incidence of disease.



7. Loose smut/ kernel smut - *Sphacelotheca cruenta*

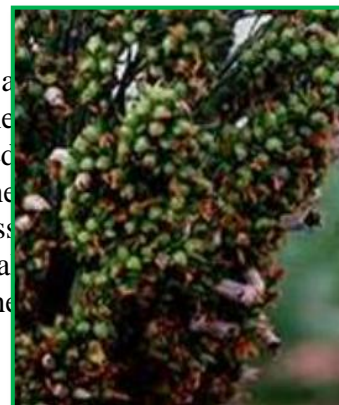
Symptoms: The affected plants can be detected before the ears come out. They are shorter than the healthy plants with thinner stalks and marked tillering. The ears come out much earlier than the healthy. The glumes are



hypertrophied and the earhead gives a loose appearance than healthy. The sorus is covered by a thin membrane which ruptures very early, exposing the spores even as the head emerges from the sheath.

8. Long smut - *Tolyposporium ehrenbergii*

Symptoms: This disease is normally restricted to a relatively small proportion of the florets which are scattered on a head. The sori are long, more or less cylindrical, elongated, slightly curved with a relatively thick creamy-brown covering membrane (peridium). The peridium splits at the apex to release black mass of spores (spore in groups of balls) among which are found several dark brown filaments which represent the vascular bundles of the infected ovary.



9. Head smut - *Sphacelotheca reiliana*

Symptoms: The entire head is replaced by large sori. The sorus is covered by a whitish grey membrane of fungal tissue, which ruptures, before the head emerges from the boot leaf to expose a mass of brown smut spores. Spores are embedded in long, thin, dark colored filaments which are the vascular bundles of the infected head.



Management for all smuts:

- ❖ Treat the seed with Captan or Thiram at 4 g/kg.
- ❖ Use disease free seeds.
- ❖ Follow crop rotation.
- ❖ Collect the smutted ear heads in cloth bags and bury in soil.

10. Ergot or Sugary disease - *Sphacelia sorghi*

Symptoms: The disease is confined to individual spikelets. The first symptom is the secretion of honey dew from infected florets. Under favourable conditions, long, straight or curved, cream to light brown, hard sclerotia develop. Often the honey dew is colonised by *Crerella sorghivulgaris* which gives the head a blackened appearance.



Favourable Conditions:

- ❖ A period of high rainfall and high humidity during flowering season.
- ❖ Cool night temperature and cloudy weather aggravate the disease.

Management:

- Adjust the date of sowing so that the crop does not flower during September- October when high rainfall and high humidity favor the disease.
- Spray any one of the following fungicides viz., Mancozeb 2 kg/ha (or) Carbendazim at 500 g/ha at emergence of ear head (5-10 per cent flowering stage) followed by a spray at 50 per cent flowering and repeat the spray after a week, if necessary.

11. Head mould/Grain mould/Head blight:

More than thirty two genera of fungi were found to occur on the grains of sorghum.

Symptoms: If rains occur during the flowering and grain filling stages, severe grain moulding occurs. The most frequently occurring genera are *Fusarium*, *Curvularia*,

Alternaria, *Aspergillus* and *Phoma*. *Fusarium semitectum* and *F.moniliforme* develop a fluffy white or pinkish coloration. *C. lunata* colours the grain black. Symptom varies depending upon the organism involved and the degree of infection.

Favourable Conditions:

- ❖ Wet weather following the flowering favors grain mould development.
- ❖ The longer the wet period the greater the mould development.
- ❖ Compact ear heads are highly susceptible.

Management:

- ❖ Adjust the sowing time.
- ❖ Spray any one of the following fungicides in case of intermittent rainfall during earhead emergence, a week later and during milky stage.
- ❖ Mancozeb 1 kg/ha or Captan 1 kg + Aureofungin-sol 100 g/ha.