



## Important Diseases of Sorghum and Its Management

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The original place of origin of sorghum is believed to be the North-East region of Africa. However, many wild species are also found in India. Sorghum is an important rain fed crop of the country for both grain and fodder purpose. At present, about approximately 13 lakh hectares of land is cultivated with sorghum in the state of Gujarat. Compared to the average production of sorghum in India, the production of Gujarat is about 100 kg per hectare (approximately). As little as possible, Factors such as fodder cultivation of sorghum, low use of fertilizers, inadequate crop protection and low number of plants per hectare are believed to be the reasons for the low production. Various diseases in sorghum are also responsible. Crop-protection is a key component, as crop-protection measures are neglected, being economically low-yielding crops, for which or not at the right time and in the required quantity.

### Major diseases of Sorghum

#### **Downy mildew:** *Peronosclerospora sorghi*

Symptom is visible as either systemic or localized infection. Systemically infected seedlings are pale yellow or have light-color streaking on the leaf, chlorotic and stunted and may die prematurely. First symptoms are visible on the lower part of the leaf blade, which later progress upward. In cool, humid weather, the lower surfaces of chlorotic leaves become covered by a white, downy growth consisting of conidia and conidiophores of the. The leaves emerging from the whorl subsequently exhibit parallel stripes of vivid green and white tissue. The infected striped areas die, turn brown, and disintegrate, resulting in a shredded appearance of the leaf. Conidia produced in the infected plants become air-borne and cause rectangular shaped local lesion on the leaf.

#### **Smut:**

**Grain smut:** *Sphacelotheca sorghi*: 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.

**Loose smut:** *Sphacelotheca cruenta*: 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.

**Head smut** - *Sphacelotheca reiliana*: 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.

**Long smut** - *Tolyposporium ehrenbergii*: This disease is normally restricted to a relatively a 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

**Anthracnose:** *Colletotrichum graminicola*: Initial symptoms of anthracnose on the leaf appear as small, elliptic to circular spots, with straw-color centre and wide margin. The lesion margin may be red, orange, blackish purple, or tan, depending on the pigment present in the cultivar (purple or tan). Adjoining spots may coalesce to give a blighted appearance on the leaf. A black dot like acervulus is often seen at the centre of the necrotic spot, which is the characteristic diagnostic symptom for leaf anthracnose. Apart from leaf the symptom may appear on the mid-rib. Leaf sheath on the stalk and on spikelet tissues. In case of severe infection, plants get defoliated and die before reaching maturity. Infected mature stalks may develop reddish internal lesions, which may be continuous or discontinuous giving the stem a ladder-like appearance. Nodal tissues are rarely discolored. If the infection is early and severe, pre emergence damping-off may occur and the seedlings wilt and die.

**Rust:** *Puccinia purpurea*

Sorghum rust appears as reddish brown pustules first on both the surfaces of the lower leaves. Generally, the upper half of the leaf gets more severe infection than the lower half. As the disease advances the infection spreads to the younger leaves. Several adjoining pustules may coalesce to form large patch on the leaves and the infected leaves die prematurely giving the plants an unhealthy appearance which becomes visible from a distance. The pustules may appear in any parts of the plant including mid-rib (arrow), peduncle and stem. The pathogen produces two types of spores in the pustules on sorghum viz., urediniospore and teleutospore.

## Integrated disease management

### Cultural practices

Many agricultural practices such as deep ploughing during summer season, cleaning of field bunds after crop harvesting, removal of crop residues from the field, uprooting the diseased plant from the field and burning, regulating irrigation water from entering into other field, if followed regularly, reduce chances of disease occurrence.

- ✓ Collateral and alternate hosts, weeds, volunteer and wild crop species harbor pathogen and serve as source of inoculums. Their timely removal helps to control diseases like ergot, downy mildew, rust, blast, leaf spots and bacterial and viral diseases.
- ✓ Deep summer ploughing, destruction of crop residues and crop rotation with non-host plant help reducing inoculums of soil-borne diseases.
- ✓ Maintaining optimum plant spacing and regulating the amount of nitrogenous fertilizer reduces incidence of blast and downy mildew.
- ✓ Insect acts as vector for many viruses and injects virus inside the plant. Injury caused by insect in plants sometime help many bacteria to enter and cause disease. Insect control, therefore, helps in managing such diseases.

### Chemical methods

- ✓ Seed treatment with Metalaxyl, Captan or Thiram at 4-6 g/kg of seed.
- ✓ Spray Metalaxyl 500 g or Mancozeb 2 kg or Ziram 1 kg or Zineb 1kg/ha.