



## Diseases of Pearl Millet and its Management

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Pearl millet is an important cereal crop of Gujarat state. Millet can withstand most drought conditions compared to other grain crops. Pearl millet gives high and sustained yield as compared to other crops in arid as well as semi-arid regions. Bajra crop is an important cereal crop of our state as it gives high yield in short duration with less water.

Talking about the diseases of pearl millet, the following diseases are mainly seen

1. Downy mildew/Green ear
2. Ergot
3. Smut
4. Rust
5. Blast

Identification and immediate control of such diseases is required otherwise they can cause more damage in the changing environment.

### 1. Downy Mildew/Green ear

This fungal disease occurs at any stage of the crop. The disease is soil borne which spreads through air. Hot and humid weather and continuous slow drizzle in monsoons help in rapid growth of pathogenic fungi. In which the spread of pathogenic sporangia on the lower surface of the leaf is by wind and rain.

**Symptoms:** The symptoms of this disease are mainly seen in two stages.

(a) Seedling stage (Initial stage):

In this stage, from the part where the leaf is attached, the yellowish leaf develops. White powdery sporangia are formed on the underside of the leaf in humid conditions. In addition, white powder is also formed on the upper surface of the leaf. Often the plant grows a foot. This makes the plant look like a broom. The plant remains yellow and small in size from a distance. As the disease progresses, the leaves eventually dry up and often the plant dies.

(b) Ear head stage: When the pearl millet comes to a head, the seeds do not sit, small curved and slightly long round green leaf-like shoots emerge. Due to such a foot, the shape of the mound looks like a broom. Thus, seeds are not planted in the whole or half of the stem and a green leg like a round curled leaf is seen. So grain production decreases in the diseased field.

**Management:** For effective control of this disease, newly developed disease resistant varieties like GHB 1129, GHB 1225, GHB 1231, GHB 538 (Maru Sona), GHB 732, GHB 744 and GHB 905 should be planted. Apply Metalexyl 35 WS at 6 gm per kg before sowing to protect the plant from downy mildew disease for the first 20-25 days after sowing., if disease is detected in standing crop or seed production plot spraying Metalaxyl 8% + Mancozeb 64% WP 10 gm/liter, 20 and 35 days after planting can prevent downy mildew disease from growing.

## 2. Ergot

Ergot disease is also caused by fungus. The pathogen remains in the soil as sclerotia (ergot tissue) or is mixed with the seed at the time of planting. Tissues lying dormant in a humid environment are more likely to grow. Spores released from them spread through the wind and reach the ear head and cause the disease at the flowering stage. Apart from this, the disease is spread by insects that suck the sap in the diseased stem.

**Symptoms:** This disease is seen only in the ear head stage. When the bud begins to flower, a viscous fluid like honey oozes from the bud. Which falls on the ear head, leaf and ground. That part looks a little whitish gray stained. It contains numerous species of fungi. Ear head's sticky fluid is replaced by dry granules that are black to gray in color, slightly larger than granules in size, and long and hard tissues. Such tissues and substances like honey contain toxic substances like alkaloids. So, care should be taken that such diseased stalks, grains and plant parts do not enter the food of animals and humans. Due to this disease, crop production is severely affected.

**Management:** This disease is spread through tissues, if tissues are found in the seeds, before sowing, dip them in 15 percent salt solution (Brine water), separate the floating fungal tissues, wash the seeds 2 to 3 times with healthy water, dry them, and use them for planting. Seed treated with Thiram 75% WP, 3 g/kg of fungicide. At the time of flowering at the stem stage (protogyny stage) spray Ziram 80% WP (2 g/l) should be sprayed if disease appeared.

## 3. Smut

This disease is caused by fungus. Spores of this fungus are found in the soil and on the outer surface of other seeds. Fungal spores germinate in the soil when the environment is humid and drizzly. which spreads through the air and cause disease in ear head stage.

**Symptoms:** The symptoms of this disease are grains filled with black sori instead of grains. In the ear head, the seeds change from normal seeds to slightly larger initially bright green and eventually grey, brown to black in colour. Such seeds break easily and the black sori (a set of spores) spreads in the air and causes the disease again in the flowering stage. If the severity of the disease is high, the quantity of diseased grains in the ear head increases and the production decreases. This disease is also seen in the ear head stage only.

**Management:** For the collective control of the above mentioned three diseases (Downy mildew, Ergot and Smut) it is necessary to take the following measures. So that the recurrence of the disease can be reduced and the severity of the disease can be minimized. Planting at the time of suitable rainfall reduces the incidence of the above diseases. Early planting reduces disease. It is not advisable to plant pearl millet after 15th July in monsoon. Late planting increases the incidence of the above diseases. If diseased plants or parts of plants are found in the field, pick or break them, collect and destroy. Crop rotation. Deep plowing in summer and letting the soil heat up is good for disease management.

## 4. Rust

This disease is usually occurring when temperature as low 10°C to as 12°C results in the development of teliospores (responsible for spreading the disease). Infestation increases when the disease is exposed to humid warm environment and the spread of fungal spores is through the air. Half of the life cycle of the spores of this disease is completed in pearl millet plants and the rest in contact with brinjal and other Solanaceae plants.

**Symptoms:** This fungal disease usually starts with small brown pin head-like, round, rust-like, numerous spots on the leaf. Intensity of the disease increases with generally warm and humid conditions and generally cool nights. The spot increases in size and eventually ruptures, releasing the pus of the pathogen. Which spread disease in plants through air. Generally, the disease is seen early in the late stage of the crop in monsoon, but seasonally if the disease occurs early and in severe form, the leaves start to turn brown and dry. The grains

remain small in size. So the production decreases, as well as the quality of fodder is also down.

**Management:** Early or timely planting of pearl millet crop can control this disease to a large extent. The field should be cleaned and other plants should be destroyed. Also destroy alternate host plants of brinjal and other Solanaceae family. Chemical fertilizers should be used as per soil test. Adopt crop rotation and use disease free seeds and immune modified varieties in planting. Diseased plants and leaves should be removed from the field and disposed of to prevent further spread. Different fungicides can be used for chemical control of rust disease like spraying Hexaconazole @0.1% can give effective control. or 0.2% Mancozeb 75 WP or spraying Zinab 75 WP (27 g/10 liters of water) at 15 days interval from the initiation of disease

## 5. Blast

**Symptoms:** Blast disease caused by fungus and affect aerial (leaf, stem and ear) parts of crop. The initial symptoms of this disease appear on leaves 20 to 25 days after transplanting or sowing. In the initial stage, small boat shaped light brown or purple color spots are appeared on the lower leaves, which gradually become broad in the middle and narrow at the edges like eyes with gray centre. Infected plants become weak and produce less ears. The grains do not fill completely and the yield is reduced.

**Management:** For effective control of this disease, newly developed disease resistant varieties like GHB 1129, GHB 1225, GHB 1231, GHB 538 (Maru Sona), GHB 732, GHB 744 and GHB 905 should be planted. If disease is appeared, immediately spray Tebuconazole 50% + Trifloxystrobin 25% WG (6.0 g/l water) or Azoxystrobin 11% + Tebuconazole 18.3% SC (17.0 ml./10 L water) and second spray first done after 15 days of first spray.