

BROWN SPOT OF RICE

Causal organism: *Bipolaris oryzae*, *Cochilobolus miyabeans* (synonyms *Dreschlera oryzae*, *Helminthosporium oryzae*)

Brown spot is a fungal disease that can infect both seedlings and mature plants. The disease causes blight on seedlings, which are grown from heavily infected seeds, and can cause 10-58% seedling mortality.

The disease was considered to be the major factor contributing to the “*Great Bengal Famine*” in 1942 resulting to yield losses of 50% to 90% and caused the death of 2 million people.

Under Guyana conditions reduction in yield can be as high as 45% in severe infection and 12% in moderate infection.

Yield losses due to brown spot epidemic in Bengal in 1942 was attributed to continuous temperature of 20°C -30°C for two months, unusually cloudy weather, and higher-than-normal temperature and rainfall at the time of the flowering and the grain-filling stages.

Figure 1: Brown spot lesions on seedling and leaf of the rice plant



SYMPTOMS

- This disease may be manifested as seedling blight or as a foliar and glume disease of mature plants.
- In seedlings the fungus produces small, circular brown lesions which may girdle the coleoptile and cause distortion of the leaves.
- The fungus may cause black discoloration of the roots.
- Infected seedlings are stunted or killed.
- In older plants, the lesions on the leaves are light brown to gray in the center and have a reddish brown margin.
- Lesions vary between 1mm to 14mm long depending on cultivar.
- On resistant cultivars the fungus produces tiny dark specks.

- Lesions may coalesce in severe infections killing large areas of affected leaves.
- The fungus can infect the glumes and the grains.
- Brown spot reduces the number of grains per panicle and the kernel weight.
- The lesions of Brown Spot can be mistaken for Blast lesions.



Figure 2 Brown spot lesions on the grains and leaf of the rice plant.

How Brown Spot survive?

- The fungus persists on infected rice seed and probably infected crop debris.
- It has traditionally been a seedling disease problem under some growing conditions but can also attack the leaves and panicles of rice plants.

THE FOLLOWING CONDITIONS FAVOR BROWN SPOT INFECTION:

- Rice suffering from either N, K, or P deficiency is especially susceptible to brown spot.
- Presence of infected seeds, volunteer rice, rice debris, and several weeds.
- Poorly drained or abnormal soils, which are deficient in nutrient elements.
- Temperature ranging from 25°C-30°C.
- Water stress and high humidity (86-100%).
- Leaves must be wet for 8-24 hours for infection to occur.
- Maximum tillering up to the ripening stages of the crop.

MANAGEMENT OF BROWN SPOT:

1. **Provide well balanced nutrients for the soil.** It has been reported that it is mainly an indicator of nutritional or physiological disorder, than a pathological one.
2. **Avoid water stress conditions.**

3. **Use resistant/tolerant cultivars** in cases where the soil amendment does not work to correct the problem. *The use of resistant varieties is the most economical means of control.*
4. The fungus can survive on seeds for up to 4 years **Seed treatment** with captan, thiram, chitosan, carbendazim, or mancozeb has been found to reduce seedling infection.
5. **Clean all rice debris and weeds** from fields which sources of inoculum.
6. Since the fungus is seed transmitted, a hot water seed treatment (53-54°C) for 10-12 minutes may also be effective before sowing.

Chemical control

- **Fugi – one** @ 500 - 750 mls/ha (½ to ¾ pts/acre) or 200 – 300 mls/acre.



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MANAGEMENT OF BROWN SPOT OF RICE (*Helminthosporium oryzae*)