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.