

## Repeat of Great Bengal Famine Unlikely Thanks to Fungicides

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Bengal, which prior to the partition of India covered the state of West Bengal in India and Bangladesh, suffered from a calamitous famine in 1943, when two million people died of starvation [1]. Altogether about 3 million people may have died as a result of the famine as disease killed those weakened by starvation [2]. The deaths occurred among the rural population who could not afford to buy rice, which had increased significantly in price due to short supply. World War II had cut off imports of rice from Burma. Shipments of food from Britain, Canada, and the USA were limited due to wartime priorities elsewhere. Food administration in India was the responsibility of provincial governments. Provinces, like Punjab, where food was not in short supply, prohibited rice exports to other regions. The Bengal government made the feeding of the urban Calcutta population a priority and requisitioned rice supplies from rural areas [2]. Many people migrated to the cities in the hope of finding employment and rice. Finding neither, they slowly died of starvation [1].

Though administrative failures were immediately responsible for this human suffering, the principal cause of the short crop supply in 1943 was the epidemic of brown spot disease which attacked the rice crop in Bengal in 1942 [1]. Nothing as devastating as the Bengal rice brown spot epidemic of 1942 has been recorded in plant pathology literature [1]. The disease caused yield reductions of rice in Bengal of 40-90% [3].

Brown spot is caused by a fungus that infects rice plants, killing large areas of affected leaves. Brown spot reduces the number of grains per panicle and the kernel weight. Climatic factors that were correlated with the brown spot epidemic in Bengal in 1942 were above-normal rainfall, high humidity, prolonged periods of cloudy weather, and warmer than average temperatures during the flowering and grain filling stages [3]. These weather conditions were very unusual; rather than ending in late August or early September, an additional 15-25 inches of rain fell through November, causing a massive release of disease spores at the exact time that rice plants were most susceptible to infection [1].

The incidence of brown spot on rice in India has increased in recent years [4]. High levels of genetic resistance have not been observed against brown spot. Use of fungicides is the main method to control brown spot outbreaks [4]. Early synthetic chemical fungicides did not provide satisfactory control of brown spot and were not recommended. However, recent research has demonstrated that new fungicide formulations provide effective control reducing brown spot incidence by 90% and preventing yield loss of 30% [4].

### References

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Map of Bengal, presently Bangladesh and West Bengal, India



Famished mother and child collect grains of rice from the road



Brown spot lesions on rice