

## Rice Fungicides Prevent Famine

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Since the first description of rice blast in the early 17<sup>th</sup> century, blast has become the biggest constraint to stable rice production [1]. Ancient records suggest that many deadly famines in Japan (1695, 1783, 1833-1837) were due to rice blast [2]. The blast fungus overwinters in rice straw and stubble. The disease spreads rapidly in the field by means of airborne spores. Severe infestations can lead to large areas of dead plants. When a blast spore penetrates the surface of a rice leaf, it does so with a force equal to 80 times atmospheric pressure or 1,600 pounds per square inch—this is by far the highest pressure recorded in living organisms. The fungus is capable of infecting rice plants in all their stages of growth.

Depending on the portion of the plant affected, the disease is also called leaf blast, node blast, panicle blast, collar blast, and rotten neck blast. When it hits the head or neck, blast stops nutrients and water from getting to the kernels, stopping kernel development. Portions of the grain head will be white in contrast to the green or tan color of healthy grain. This “blasted” appearance is caused by sterile or blank grain. Leaves and whole plants are often killed. Blast has the potential to reduce yields by 80 percent.

Rice growers remained powerless in controlling epidemics of rice blast until the early 1900s when copper sprays were shown to be effective. However, copper damaged rice plants and the treatment was not widely used. Research from 1949-1952 demonstrated that synthetic chemical fungicides were highly effective in controlling blast, reducing infection levels from 41 to 6 percent [3]. Following a blast epidemic in 1953 that reduced rice production by 7 percent, Japan's farmers adopted regular applications of fungicides [4]. The Japanese government erected a monument in honor of the fungicide chemical where the first trials were carried out at Nankoku [5].

Rice blast epidemics caused a major food crisis in Korea in the 1970s. Estimates indicate yield losses ranging from 10 to 50 percent [6]. Since the 1970s, Korean rice farmers have regularly used fungicides for blast control. Currently, rice blast is estimated to reduce Korean rice production by only 0.02 percent [1].



Monument to fungicidal rice blast control in Nankoku, Japan



Leaves infected with rice blast



Spraying for rice blast

### References

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