

## Disease Ecology and Forecasting of Rice Bacterial Grain Rot

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Since Rice bacterial grain rot (RGBR) was reported at 1986 in Korea, it has been severely occurred in 1994, 1995, 1998, and especially around 16,609 ha in 2000, and became a major disease in rice cultivation field. This study was focused on investigation of ecology of RGBR, weather conditions that affect development of epidemics, and development of an effective RGBR forecast system based on weather conditions during the rice heading period.

In the field, the severely diseased panicles were observed at one or two weeks after the heading time. As the infected panicles were increased, the ripened grain ratio and 1000 grains weight were decreased. Yield of rice was consequently decreased from 6.5 % to 35.9 % in diseased fields. The RGBR pathogen was detected in some healthy seeds collected from the diseased field. These results implicate that the pathogen could be transmitted through the seeds.

The epidemic of RGBR was more severe in the machine transplanting cultivation (16.3 %) than the hand transplanting cultivation (1.7%). Over application of nitrogen fertilizer resulted in severe disease development. Although the disease was more severe in some rice varieties such as Chucheongbyeo, Dongjinbyeo, and Seomjinbyeo, it appears that the disease severity seems to be depended on favoring weather conditions for disease development during rice heading times of the varieties.

In the field, the high temperature and rainfall of the inoculation day are the most important factors for development of rice bacterial grain rot. The diseased panicles were highly correlated with average of minimum temperature ( $r=0.86^{**}$ ) and rainy days ( $r=0.78^{**}$ ). Using the temperature and relative humidity index (THI) was calculated with minimum temperature, rainfall, and relative humidity, simple predicted model,  $\text{RGR} = 1.325 \text{ THI} - 0.0677$  ( $R^2=0.753^{**}$ ), was made. This model showed the high correlation ( $r=0.76^{**}$ ) between the predicted RGBR incidence and the actual RGBR incidence in 1998 and 2000. Based on this model and the data of Jeonnam province meteorological administration, RGBR forecasting service through Internet (<http://weather.jares.go.kr>) was done.

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