

## ***X. oryzae* and its pathotypes in Indonesia**

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Leaf blight may damage rice in Indonesia when susceptible varieties are planted and weather conditions are suitable. Studies by various researchers in the past 5 years conclude that several pathotypes occur.

Based on the Kozaka Grouping System, four pathotypes have been identified and labeled pathotypes III, IV, V, and VI. Pathotype III appears to be the most common and most widespread in Indonesia. Pathotypes I and II do not currently occur there. Pathotype IV has a broad spectrum of virulence and can infect varieties of all groups.

To differentiate pathotypes in Indonesia, the four groups of varieties in the Kozaka System are expanded into five: Kinmaze, Kogyoku, Rantai Emas, Wase Aikoku, and Jawa. The Indonesian differentials are Kencana and Padi Jambu, representing the Kinmaze group; IR5, representing Kogyoku; Rantai Emas and Tetep, representing Rantai Emas; Kuntulan, representing Wase Aikoku; and Remaja and Jelita, representing Jawa.

Tests using the bacterial exudation technique indicate that several varieties have moderate to high levels of quantitative resistance to *X. oryzae* in Indonesia. They are Dara, Remaja, Jelita, IR20, IR22, IR26, IR28, IR29, IR30, Syntha, Dewi Ratih, Pelita I/1, Pelita I/2, and Nihonbare. ❧

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## ***Xanthomonas oryzae* strains in Thailand**

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Samples of bacterial leaf blight of rice were collected from four parts of Thailand from 1972 to 1977: 31 isolates from the central region; 28 isolates, northern; 13, northeastern; and 26, southern. Their pathogenic behavior was tested on three rice varieties that show different degrees of resistance or

susceptibility in Thailand. The varieties were PN 16/Sigadis and IR8/Tadukan (resistant), and RD 1 (highly susceptible). Plants with four fully developed leaves were inoculated beside the main vein at the middle part of each leaf blade by single-needle pinprick. Observations were made 15 days after inoculation, using the International Rice Research Institute (IRRI) scale. Comparisons of the pathogenicity of the isolates were also made from bacteriophage tests using the streak plate method. The pathogenic strains of bacterial leaf blight of rice in Thailand seem to fall into three groups. Pathogenic strain A produced big lesions in both resistant and susceptible varieties. Strain B produced big lesions only in the susceptible variety and small lesions in the resistant varieties. Strain C produced small lesions in both susceptible and resistant varieties. The predominant pathogenic strain was strain B. According to their sensitivity to the five types of bacteriophages, the isolates of *X. oryzae* in Thailand fell into 12 groups (A, B, C, ... L). Bacterium strain A predominated; it was distributed throughout the country. Strain B was mainly in central and southern areas, and Strain C was found everywhere in Thailand except in the northeast. Strain E was predominant in southern Thailand. Strains A, B, C, D, and E encompassed more isolates than the others, which presented only one or two isolates each. The fact that strain B was sensitive to all of the Thai *X. oryzae* bacteriophages was useful for the forecasting of bacterial leaf blight of rice in Thailand. No correlation was observed between pathogenic strains and phage-sensitive strains. ❧

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## **Grouping of *Xanthomonas oryzae* isolates in terms of virulence in Japan**

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Grouping of *Xanthomonas oryzae* isolates in terms of pathogenicity or virulence has been attempted in Japan since 1957. Isolates from various Japanese sites were assigned to group A or B, each containing three subgroups, or to group I, II, or III, by needle prick inoculation of young leaves or flag leaves

of the differential rice varieties. Some workers used more than 10 rice varieties for differentiation; others used wild rices and weeds as well. Classification methods and criteria varied markedly. Multineedle prick inoculation of the flag leaves of four groups of differential varieties (Kinmaze, Kogyoku, Rantai Emas, and Wase Aikoku) has recently been recommended to standardize reporting of pathogenicity in Japan.

Isolates can be grouped as follows:

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|-----------|---|
| Group I   | virulent to only Kinmaze varieties                      |
| Group II  | virulent to Kinmaze and Kogyoku varieties               |
| Group III | virulent to Kinmaze, Kogyoku, and Rantai Emas varieties |
| Group IV  | virulent to all varieties                               |

The criterion was established by inoculating the leaves of young seedlings with Japanese isolates only. Some attempts were made to apply the criterion to tropical isolates. Because using tropical isolates in the field in Japan is impracticable, young seedlings were inoculated in the greenhouse. Pathogens with higher virulence than the Japanese isolates seem to be frequent and widely distributed in the tropical areas, particularly in India, Cambodia, and Thailand. With some exceptions, virulent isolates showed high virulence to all varieties, isolates with low virulence expressed it with all varieties. Clearcut specialization in pathogenicity was not observed. By the above criterion, most of the highly virulent isolates were considered to belong to Group III or IV.

An isolate showing a distinct pathotype was reported recently to exist in Bali, Indonesia. A group V (virulent to Kinmaze and Wase-Aikoku group varieties) was proposed. Pathotype differentiation was also noticed at the International Rice Research Institute. When young seedlings are inoculated, the virulence of *X. oryzae* isolates seems generally to vary quantitatively, depending on the combinations of isolates and hosts, without clearcut specialization. The groups suggested above will, therefore, be separated into the smaller clusters according to judgments of virulence, or by additions to the differential varieties. Of course, data suggesting pathogenic specialization