

## **Disease Resistance (81 ~ 83)**

**H-81 Disease resistance induced by silicate(Si) treatment against blast disease in rice.** B. R. Kim<sup>1</sup>, E. W. Park<sup>2</sup>, J. H. Roh<sup>1</sup>, I. S. Oh<sup>1</sup>, S. S. Han<sup>1</sup>. <sup>1</sup>Div. of Crop Environ. & Bio. Tech. National Institute of Crop Science, RDA, Suwon, 441-857, Korea. <sup>2</sup>School of Agricultural Biotechnology, Seoul National Univ., Seoul 151-921, Korea.

Two rice cultivars, Jinmi and Suwon345, grown under hydroponic culture system with a nutrient solution containing 0 and 150ppm of sodium silicate were inoculated, respectively, with two rice-blast compatible isolates, 02-319 (KJ-105a) and 93-456 (KI-409), at three growing stages of rice plants, 5~6 leaf, maximum tillering, and heading stages. The control plants of both cultivars inoculated with either of the blast isolates at the 5-6 leaf stage resulted in 36-39% of DLA measured 7 days after inoculation, whereas those grown in the presence of Si(150ppm) had only 0.64-1.90% of DLA indicating its strong resistance to the pathogens. At the maximum tillering and heading stages, the plant of both cultivars grown with and without the Si and inoculated with either of the isolates resulted in 0.1-1.17% and 16.1-67.7% of DLA, respectively. The Si also affected the incidence of panicle and neck blast diseases. Thirty days after inoculation with the pathogen at the heading stage of control plants, the incidences of panicle and neck blast diseases were 16.1-67.7% and 6.5-45.8%, respectively, whereas those in silicated plants were 0-13.5% and 0-10.8%, respectively. In the mechanism of Si-induced rice resistance to blast disease, it has been investigated that the silicated leaves form a physical barrier of some sort in leaf surface that protect host cells by preventing the invasion of blast fungus. Results of this study suggest that rice blast resistance induced by silicate has an effect on the whole rice plant parts throughout the growing stages.

**H-82 Epidemiological effect of gene deployment on Bacterial leaf blight of rice.** Min-seon Choi, Hyungjoon Park, Joo-Hee Lee, Hyun-Kyung Kim, Seungdon Lee, Dongsoo Ra, and Sunggi Heu. Division of plant pathology, NIAST, RDA, Suwon Korea

Bacterial leaf blight of rice (*Oryza sativa* L.), caused by *Xanthomonas oryzae* pv. *oryzae*, is a serious disease of global importance. No effective and economical chemical control methods are available. The major means of management is through the use of resistant cultivars. Isolates collected from various localities in Korea were examined for their virulence to 20 different monogenic lines of rice. The reaction of isolates to different monogenic lines were different dramatically depends on the year and place

which they were collected. Most pathogens isolated in Chunra providence were able to cause disease on Xa3 monogenic lines but most pathogens isolated in Kyungi, Cungchung, and Kyungsang providence were not able to cause disease on Xa3 monogenic lines. The high frequency of race K3 isolates in the Chunra region may have resulted from the dominant cultivation of Xa3 deployed cultivars such as Shindonjin, Dongjin1, and Junam. Almost all isolates in Korea were not able to cause disease on Xa4 resistant monogenic lines. Therefore, Xa4 may be a good source for resistant rice breeding in Korea. Based on the reaction of isolates to monogenic lines, the Korean isolates were grouped into 19 different pathotypes. The reaction of 19 different pathotypes to 34 generally cultivated rice cultivars in Korea were tested. Among the 34 tested rice cultivars, only few cultivars showed resistance to tested 19 pathotypes. Youngnam and Whayoung showed good resistance to most tested pathogens and Kewha showed good resistance to some pathotypes but it showed severe disease symptoms by some pathotypes.

**H-83 Variation in infection levels of western white pine seedlings grown in three nurseries in northern Idaho.** Kwan-Soo Woo<sup>1</sup>, Lauren Fins<sup>2</sup> and Tae-Su Kim

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Western white pine (*Pinus monticola* Dougl.) seedlings grown for two growing seasons in three nurseries in northern Idaho were compared for infectability when inoculated with basidiospores of *Cronartium ribicola*. Eight needle traits, including surface wettability, were evaluated relative to nursery location and infectability. Statistically significant differences were found in needle length and width, stomatal rows, stomata per row, stomata per needle, adaxial surface area, stomatal density, and contact angles of applied water droplets. Lewiston Nursery seedlings had the lowest stomatal density and the lowest spore germination percentage, but the highest mean level of infection, and highest infection efficiency. Lewiston seedlings also had the smallest needles and lowest needle surface wettability (highest contact angles). Since genetic, environmental and physiological effects were confounded in this study, the effect of nursery environment on morphological traits and infectability of seedlings with *Cronartium ribicola* could not be determined. However, the relationship between the high level of infection and the immature developmental state of the seedlings grown in the Lewiston Nursery is intriguing and suggests that with physiological immaturity, resistance mechanisms may not be fully developed. Further investigation of these relationships should be conducted using a single genetic source and comparable developmental states in different environments.