

Host Range of Korean Isolates of *Magnaporthe grisea*

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한국에서 분리한 벼 도열병균의 기주범위

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ABSTRACT : Twelve isolates of *Magnaporthe grisea* originating from rice, crabgrass, and tall fescue were inoculated on twelve sets of gramineous seedlings to determine their host range. Most of isolates were pathogenic to rice, wheat, corn, rye, oat, tall fescue, and green foxtail. These results indicated that green foxtail surrounding rice fields could serve as an inoculum source of rice blast fungus in Korea.

Key words : rice blast, host range, *Magnaporthe grisea*.

Magnaporthe grisea (Hebert) Barr is a pathogen of a large number of grass species but best known as the causal agent of the rice blast, the most serious rice disease throughout the world (6). Individual strains of *M. grisea* causing diseases on different host plants show a more restricted host range than the species as a whole (1). Much research has been conducted to define the host range of the fungus, but contradictory results imply the difficulty of pinpointing a precise host range (3~5).

A precise knowledge of the host range is important to elucidate the role of grasses, weeds, and other crops surrounding rice fields as potential sources of inocula and to identify the relationship among strains from various hosts. The objective of this study was to provide information on the host range of Korean isolates of *M. grisea*.

Twelve isolates of *M. grisea* originating from rice (*Oryza sativa*), crabgrass (*Digitaria sanguinalis*), and tall fescue (*Festuca arundinacea*) were tested for their host range on twelve different crop and weed species (Table 1). These plant species are rice (*Oryza sativa*), wheat (*Triticum aestivum*), barley (*Hordeum vulgare*), corn (*Zea mays*), rye (*Secale cereale*), oat (*Avena sa-*

tiva), tall fescue (*Festuca arundinacea*), barnyardgrass (*Echinochloa crus-galli*), goosegrass (*Eleusine indica*), crabgrass (*Digitaria sanguinalis*), green foxtail (*Setaria viridis*), and panicum (*Panicum bisulcatum*).

Conidia of each isolate were harvested from 10-day-old colonies on oatmeal agar (50 g oatmeal per liter) and the concentration of conidial suspension was adjusted to 2×10^5 /ml. Inoculation was done by spraying about 20 ml of conidial suspension by an air compressor on seedlings at third to fourth leaf stages. After inoculation, the plants were kept in dew chamber (100% RH) for 24 hrs and transferred to a growth chamber. Disease reaction was observed 6 days after inoculation. Plants showing the typical blast symptom on the leaf are recorded as +, and plants showing no symptom are recorded as -. Pathogenicity tests were repeated at least three times.

All of *M. grisea* isolates originating from rice were pathogenic to rice, wheat, barley, corn, and rye in this study. Ikegami (4) also reported that rice isolates infect barley, wheat, oat, and rye. Wheat blast isolates infect crops including barley, rye, oat, corn, and tall fescue, but none of these isolates infect rice in Brazil (5). However, this is contradictory to the previous report that wheat blast isolates infect rice plants (2). These contradictory results suggested that several clonal lineages

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Table 1. Host range of *Magnaporthe grisea* isolates originating from rice, crabgrass, and tall fescue

Isolates	Origin	Pathogenic to												
		Os ^a	Ta	Hv	Zm	Sc	As	Fa	Ec	Ei	Ds	Sv	Pb	
MG03	Rice	+ ^b	+	+	+	+	+	-	-	-	-	+	-	
MG04	Rice	+	+	+	+	+	+	+	-	-	-	+	-	
MG06	Rice	+	+	+	+	+	+	+	-	-	-	+	-	
MG07	Rice	+	+	+	+	+	+	+	-	-	-	+	-	
MG08	Rice	+	+	+	+	+	-	-	-	-	-	+	-	
MG14	Rice	+	+	+	+	+	+	-	-	-	-	+	-	
MG15	Rice	+	+	+	+	+	+	+	-	-	-	+	-	
MG16	Rice	+	+	+	+	+	+	+	-	-	-	+	-	
MG19	Rice	+	+	+	+	+	+	+	-	-	-	-	-	
MG20	Rice	+	+	+	+	+	+	+	-	-	-	+	-	
MG102	Crabgrass	+	+	+	+	+	+	+	-	-	-	-	-	
MG103	Tall fescue	+	+	+	+	+	+	+	-	-	-	+	-	

^a Os : *Oryza sativa* (Rice), Ta : *Triticum aestivum* (Wheat), Hv : *Hordeum vulgare* (Barley), Zm : *Zea mays* (Corn), Sc : *Secale cereale* (Rye), As : *Avena sativa* (Oat), Fa : *Festuca arundinacea* (Tall fescue), Ec : *Echinochloa crus-galli* (Barnyardgrass), Ei : *Eleusine indica* (Goosegrass), Ds : *Digitaria sanguinalis* (Crabgrass), Sv : *Setaria viridis* (Green foxtail), Pb : *Panicum bisulcatum* (Panicum).

^b + and - indicate pathogenic and nonpathogenic, respectively.

of the blast fungus may exist in the same field in their pathogenicity on different hosts. An isolate originating from crabgrass was pathogenic to all crops tested and its original host, whereas a tall fescue isolate was pathogenic to all crops and green foxtail. No rice isolate was pathogenic to barnyardgrass, goosegrass, crabgrass, and panicum in this study, but nine rice isolates (90%) were pathogenic to green foxtail. The fact that rice blast fungus incites disease symptoms on green foxtail indicated that green foxtail could serve as a host of rice blast pathogen in Korea. Since green foxtail is popular surrounding rice fields in Korea, blast on green foxtail should be monitored more accurately during summer season for rice blast.

요 약

벼, 바랭이, 툭페스큐로부터 분리한 벼 도열병균에 대한 기주범위를 벼, 밀, 보리, 옥수수, 호밀, 귀리, 툭페스큐 등의 작물과 피, 왕바랭이, 바랭이, 강아지풀, 개기장 등의 잡초를 대상으로 실험하였다. 대부분의 균주들은 공시작물 모두와 잡초인 강아지풀에 대하여 병원성을 나타내었다. 이러한 결과는 논 주변의 강아지풀이 벼 도열병균의 기주로 작용할 수 있음을 나타내었다.

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