

disease incidence. Seedlings aged 25 and 45 days were separately inoculated with virus. Results indicated RD incidence was higher in 25-day-old seedlings (see table). On average, 69% of seedlings became infected when inoculated at 25 days. Only 26.8% of seedlings were infected when inoculated at 45 days. NR6-5-16-18B₁ and NR6-5-46-48 showed higher percentage of infected seedlings when inoculated at 45 days. IR3707-117-2 was disease-free at both ages.

This study suggests rice seedlings build resistance to RD as age increases. Age specificity of disease incidence shown by some cultivars (see table) indicates resistance to this virus may depend on crop growth stage. CH45 showed 100% infection in both inoculation stages. It can be used as a good susceptibility check for RD varietal screening in Nepal. *ks*

Effect of seedling age on rice dwarf incidence at Khumaltar, Nepal, July 1981.

Cultivar	25-day-old seedlings		45-day-old seedlings	
	Inoculated (no.)	Infected (%)	Inoculated (no.)	Infected (%)
IET2938	10	20	9	11
IR2061-628-1	9	56	10	10
Chandina	8	100	10	70
BG94-1	7	57	10	40
CH45	10	100	10	100
NR6-5-46-45	10	100	10	90
IR2070-414-3	10	70	10	10
IR2071-124-6-5	10	80	10	0
IR2071-586-5-6	10	70	10	40
BR4	8	50	9	0
BR51-91-6	10	80	10	10
IR2797-125	10	33	8	0
NR6-5-16-18B ₁	10	50	10	70
IET4183	6	50	10	10
IR3707-117-2	10	0	10	0
IR3941-25-1	9	89	10	0
IET1444	8	75	10	40
Se 322-G-19	10	100	10	20
IR2061-522-6-9	8	88	10	10
NR6-5-46-48	10	30	8	50
NR6-7-83-46	10	100	10	40
BG374-2	9	89	10	10
BC374-1	10	100	10	20
IET4094	11	91	10	20
IR22	10	40	9	0
Mean		69		27

GENETIC EVALUATION AND UTILIZATION

Insect resistance

Reactions of some Korean rice varieties to brown planthopper biotype 2

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Susceptibility of rice varieties with or without *Bph 1* gene for resistance to brown planthopper biotypes 1 and 2 was studied in the greenhouse.

Resistant Korean cultivars and sus-

ceptible varieties were screened at different days after infestation (DI) using the seedling bulk test. Pungsanbyeo (without resistance gene), Baekunchalbyeo (*Bph 1*), and Milyang 63 (*bph 2*) were

Table 1. Reactions of selected rice varieties to BPH biotypes 1 and 2 at seedling stage at different days after infestation. Korea, 1981.

Variety	Resistance gene	Damage rating ^a at given days after infestation							
		Biotype 1				Biotype 2			
		9	11	13	15	9	11	13	15
Pungsanbyeo	None	MR	MR	M	M	R	R	MR	M
Iri 358	"	MS	S	S	S	R	MR	MS	MS
Milyang 23	"	MR	MR	MS	MS	R	MR	M	M
Suweon 307	"	S	S	S	S	MR	MR	MS	S
Baekunchalbyeo	<i>Bph 1</i>	R	R	R	R	M	S	S	S
Milyang 58	"	R	R	R	R	MS	S	S	S
Milyang 60	"	R	R	R	R	M	MS	S	S
Hangangchalbyeo	"	R	R	R	R	MR	MS	S	S
Milyang 61	"	R	R	R	R	MR	MS	S	S
Milyang 57	"	R	R	R	R	M	M	MS	S
Suweon 309	"	R	R	R	R	MR	M	MS	S
Milyang 55	"	R	R	R	R	R	MR	MS	S
Milyang 56	"	R	R	R	R	R	MR	MS	S
Iri 352	"	R	R	R	R	MR	MR	MS	S
Nampungbyeo	"	R	R	R	R	R	MR	M	M
Cheongcheongbyeo	"	R	R	R	R	R	MR	M	S
Iri 357	"	R	R	R	R	R	MR	M	M
Milyang 30	"	R	R	R	R	R	MR	M	M
Milyang 63	<i>bph 2</i>	R	R	R	R	R	R	R	MR

^aBased on seedling bulk test: R = resistant, S = susceptible, MR = moderately resistant, MS = moderately susceptible.

standard checks.

Pungsanbyeo, Iri 358, Suweon 307, and Milyang 23, all without *Bph 1*, were moderately resistant to biotype 2 at 11 DI. Baekunchalbyeo, Hangangchalbyeo, and Milyang 57, with *Bph 1*, were moderately susceptible or susceptible to biotype 2 (Table 1).

In another experiment, 50 2d- or 3d-instar BPH nymphs were caged in circular plastic tubes (5 × 30 cm) on individual plants of each variety 25 days after seeding. There were four replications for each variety. Pungsanbyeo was moderately susceptible to biotype 1 at 4 DI, susceptible at 10 DI, and was killed within the next 5 days. It was moder-

Table 2. Damage reactions of different rice varieties to BPH biotypes 1 and 2. Korea, 1982.

Biotype	Variety	Resistance	Damage rating ^a	
			4 DI	10 DI
1	Pungsanbyeo	None	M	S
	Baekunchalbyeo	<i>Bph 1</i>	R	MR
	Milyang 63	<i>bph 2</i>	MR	MR
2	Pungsanbyeo	None	MR	MS
	Baekunchalbyeo	<i>Bph 1</i>	S	S
	Milyang 63	<i>bph 2</i>	R	R

^aDI = days after infestation, R = resistant, S = susceptible, MR = moderately resistant, MS = moderately susceptible.

ately resistant to biotype 2 at 4 DI and moderately susceptible at 10 DI. Baekunchalbyeo with *Bph 1* was readily killed and considered extremely susceptible to biotype 2. Milyang 63 with *bph 2* had resistance to biotypes 1 and 2

(Table 2).

Varieties without resistance genes were more susceptible to biotype 1 than to biotype 2. Capacity of the two biotypes to attack different rice varieties differs. *h*

Differences between seedling bulk and population buildup tests of varietal resistance to whitebacked planthopper

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For the seedling bulk test, 10 varieties were sown in 15-cm-long rows in plastic boxes (10 × 10 × 50 cm) in the greenhouse. One-week-old seedlings, 20 per variety, were infested with 6-8 whitebacked planthopper (*Sogatella furcifera* H.) nymphs each. Plant reactions were graded 7, 10, 13, 15, and 23 days after infestation (DAI), according to the

Standard Evaluation System for Rice.

For the population buildup test, the same 10 varieties were transplanted in wagner pots (20 × 15 cm) in the field on 27 May and 5 pairs of planthoppers/pot were caged on 6 July. Insects were counted 20, 30, 40, and 60 days after infestation.

Results between the seedling bulk test and the population buildup test were different. In the seedling bulk test, 5 varieties were moderately resistant or resistant 7 days after infestation (Table 1). All were susceptible or moderately susceptible at 23 DAI. In the population buildup test, all varieties except Nampungbyeo had high insect buildups (Table 2).

Final rating by the seedling bulk test should be made after there is no further increase in damage. *h*

Table 1. Variety reaction to whitebacked planthopper as measured by the seedling bulk test in Korea.

Variety	Reaction ^a at indicated days after infestation				
	7 d	10 d	13 d	15 d	23 d
Nampungbyeo	MR	I	I	MS	MS
Jinjubyeo	MR	I	MS	S	S
Suweon 295	S	S	S	S	S
Milyang 30	S	S	S	S	S
Suweon 305	S	S	S	S	S
Suweon 301	MR	MR	I	I	S
Mityang 23	MR	I	MS	MS	S
Baekunchalbyeo	R	MR	MR	MR	MS
Suweon 299	I	MS	MS	S	S
Suweon 298	I	MS	MS	S	S

^aS = susceptible, MS = moderately susceptible, I = immediate, MR = moderately resistant, R = resistant.

Table 2. Population buildup of whitebacked planthopper on rice plants infested at 40 days after transplanting in pots in Korea.

Variety	Population (no.) at indicated days after infestation								Damage ^a
	20 d		30 d		40 d		60 d		
	Nymph	Adult	Nymph	Adult	Nymph	Adult	Nymph	Adult	
Nampungbyeo	152	0	23	190	0	43	0	18	3
Jinjubyeo	148	0	15	118	86	64	19	30	2
Suweon 295	154	0	12	114	220	104	67	37	5
Milyang 30	64	0	17	148	234	68	76	19	8
Suweon 305	108	0	21	57	266	100	214	82	4
Suweon 301	120	0	38	146	270	321	47	102	7
Milyang 23	94	0	12	114	286	61	158	21	5
Baekunchalbyeo	120	0	16	118	710	212	358	40	9
Suweon 299	98	0	13	154	760	100	52	60	8
Suweon 298	122	0	36	108	930	111	380	117	9

^a0 = no damage, 9 = hopperburned.