glasshouse conditions with three replications. Local resistant check ARC6248 was included.

We evaluated the entries using the 0-9 scale of the *Standard evaluation system for rice* when susceptible check TN1 died.

Twelve entries were scored as resistant (3.0-3.7), 18 were moderately resistant (4.3-5.0), 28 susceptible (5.7-7.0), and 7 highly susceptible (7.7-9.0). Promising entries are listed in the table. ■

Screening rice varieties and lines for resistance to yellow stem borer (YSB) based on preference or nonpreference and antibiosis

M. Riaz, M. Ahmed, and A. Butt, Rice Research Institute, Kala Shah Kaku, Punjab, Pakistan

We screened 16 varieties and lines for resistance to YSB *Scirpophaga incertulas* in a cage in 1990. We transplanted five seedlings of each entry with a spacing of 25 cm between plants and 35 cm between varieties. The experimental design was completely randomized. We collected three replications of adult female moths from fields and kept them on Basmati 370 in a separate cage for oviposition. Each tiller was artificially infested 30 d after transplanting with two first-instar larvae that had been collected from the egg masses.

Five tillers with deadhearts from each variety were randomly dissected and larvae removed and weighed at 20 d after infestation.

We studied preference or nonpreference mechanism of resistance by randomly placing all entries in a wooden cage in three replications. Test material was exposed to oviposition by 100 female YSB moths early in the morning. We counted the egg masses laid on varieties and lines after 2 d.

TKM6, Basmati 385, and 4321 had the fewest deadhearts and whiteheads of the test entries (see table). TKM6 and Basmati 385 exhibited the nonpreference and antibiosis mechanism of resistance. 4321 showed preference and antibiosis behavior for YSB. Basmati 370, Basmati 198, and 4439 were susceptible to YSB. Other varieties and lines were moderately resistant to YSB. Resistant varieties exhibited nonpreference and antibiosis mechanism of resistance. ■

Performance of 16 varieties and lines under antibiosis and preference/nonpreference mechanism of resistance.[a] Punjab, Pakistan, 1990.

Variety or line	Av deadhearts (%)	Av weight of 5 larvae (mg)	Egg mass (av no.)
Basmati 385	15.91 ef	0.187 f	2 de
Basmati 370	44.66 a	0.277 d	6 c
4048	31.07 abcde	0.285 cd	4 cd
Basmati 198	36.73 abcd	0.300 abc	4 cd
6129	40.37 abc	0.310 a	4 c
PK2773-1-2-3	22.98 cdef	0.289 bcd	3 de
1053-2-4	38.22 abcd	0.301 abc	4 cd
4439	37.06 abcd	0.302 ab	9 b
4029-1	26.79 abcdef	0.285 bcd	10 e
4029-2	42.83 ab	0.310 a	4 cd
PK729-15-7	24.66 cdef	0.311 a	4 cd
1053-1-2	28.65 abcdef	0.301 abc	3 de
50189-8-6	25.78 bcdef	0.290 bcd	1 e
4321	17.66 ef	0.240 e	14 a
4048-3	22.19 def	0.302 ab	4 cd
TKM6	11.61 f	0.182 f	10 e
	LSD = 18.07		LSD = 2.58

[a]In a column, means followed by a common letter are not significantly different at the 5% level by DMRT.

Changes in brown planthopper (BPH) biotypes in the Mekong Delta of Vietnam

Nguyen Long Chau, Southern Regional Center for Plant Protection (SCPP), Tiengiang Province (Mekong Delta); Nguyen Cong Thuat and Vu Thi Chai, Institute of Plant Protection (IPP), Hanoi, Vietnam

BPH is one of the important insect pests of rice in southern Vietnam. In 1988-91, popular varieties IR36, IR66, IR42, MTL 61 (IR19728), and MTL 58 (IR13240-108-3-2-2)—all of which have the *bph 2* resistance gene—were hopperburned in many areas of the Mekong Delta.

We collected seven BPH field populations from different agroecological areas of the Mekong Delta in 1991 to determine the changes in BPH biotype using the modified bulk seedling test. Check varieties were seeded in 20-cm rows, 5 cm apart, in 60- × 40- × 10-cm seedboxes and replicated three times. Test entries were infested 7 d after seeding with seven second- and third-instar nymphs per seedling. We visually rated damage using the *Standard evaluation system for rice* 0-9 scale when the susceptible check TN1 had died.

All BPH populations studied killed TN1. Mudgo *(Bph 1)* was susceptible to all seven BPH populations. The resistance of ASD7 *(bph 2)* broke down, indicating that BPH biotype 2 had developed a new distinct biotype that was not similar to biotype 3 from IRRI. Rathu Heenati *(Bph 3)* and Ptb 33 (digenic gene) were still resistant to all populations. Babawee *(bph 4)* was moderately susceptible or susceptible to all BPH populations (Table 1 on next page).

BPH virulence in the Mekong Delta is apparently increasing because of natural adaptive selection. Reactions of different populations in various areas were relatively similar. It appears that a new biotype, the "Mekong Delta BPH population," has developed.

To clarify the new biotype reaction, we compared it with biotypes of some Asian rice-growing countries. The new BPH biotype is completely different from those in the Philippines, Bangladesh, Sri Lanka, and India (Table 2 on next page). ■

Table 1. Reaction[a] of some susceptible and resistant check varieties to 7 BPH populations in the Mekong Delta, Tiengiang, Vietnam, 1991.

Variety	Gene for resistance	BPH population: Chau Thanh, Tiengiang		Longho, Cuulong		Chauthanh, Bentre		Caolanh, Dongthap		Thoaison, Angiang		Gionggieng, Kiengiang		Baclieu, Minhhai	
		Score[b]	Reaction	Score	Reaction	Score	Reaction	Score	Reaction	Score	Reaction	Score	Reaction	Score	Reaction
TN1	None	9.0	S	9.0	S	9.0	S	9.0	S	9.0	S	9.0	S	9.0	S
Mudgo	*Bph 1*	7.6	S	5.6	S	7.6	S	7.6	S	7.0	S	7.6	S	7.6	S
ASD7	*bph 2*	7.6	S	7.6	S	8.3	S	7.0	S	7.0	S	8.3	S	8.3	S
Rathu Heenati	*Bph 3*	1.0	R	1.0	R	1.0	R	1.0	R	1.0	R	1.0	R	1.0	R
Babawee	*bph 4*	5.6	S	5.0	MS	6.3	S	5.6	S	5.0	MS	7.0	S	6.3	S
Ptb 33	*bph2, Bph 3*	1.0	R	1.0	R	1.0	R	1.0	R	1.0	R	1.0	R	1.0	R

[a]R = resistant, MS = moderately susceptible, S = susceptible. [b]Score = av of 3 replications.

Table 2. Reaction[a] of some susceptible and resistant check varieties to BPH biotypes in Asia and the Mekong Delta, Vietnam.

Variety	Gene for resistance	IRRI, Philippines[b]: Biotype 1	Biotype 2	Biotype 3	Bangladesh[b]	Sri Lanka[b]	India[b]: Hyderabad	Cuttack	Mekong Delta, Vietnam[c]
TN1	None	S	S	S	S	S	S	S	S
Mudgo	*Bph 1*	R	S	R	S	S	S	S	S
ASD7	*bph 2*	R	R	S	S	S	S	S	S
Rathu Heenati	*Bph 3*	R	R	R	R	R	S	S	R
Babawee	*bph 4*	R	R	R	R	R	R	S	S
Ptb 33	*bph 2, Bph 3*	R	R	R	R	R	R	R	R
ARC10550	*bph 5*	S	S	S	R	R	R	R	-

[a]R = resistant, S = susceptible. [b]Data from O. Mochida and E. A. Heinrichs, 1980. [c]Data from N. L. Chau, Nguyen Cong Thuat, and Vu Thi Chai, 1991.

Rice resistance to leaffolder (LF) in tidal wetlands

M. Thamrin and H. Rosmini, Banjarbaru Research Institute for Food Crops, P.O. Box 31, Banjarbaru, South Kalimantan, Indonesia

We field-tested 22 promising lines for resistance to LF in the tidal wetlands of Tarantang, South Kalimantan, during the 1991-92 wet season.

Seedlings of each line were transplanted 21 d after seeding at 25- × 25-cm spacing in a 20-m² plot with three replications. Recommended agronomic practices were followed. We evaluated LF damage 45 d after transplanting.

Line IR24637-38-2-2 is resistant and other lines are moderately resistant (see table). ■

Reaction of promising lines to LF. Tarantang, South Kalimantan, Indonesia, 1991-92 wet season.

Line	Score[a]	Reaction[b]	Line	Score[a]	Reaction[b]
IR24637-38-2-2	1	R	IR13426-19-2	3	MR
IR21567-9-2-2-3-1-3	3	MR	IR11288-B-B-69-1	3	MR
IR31429-14-2-3	3	MR	B5344-Sm-61-2-1	3	MR
IR31432-7-2	3	MR	B5332-3d-Mr-2-4	3	MR
IR51500-AC9-7	3	MR	B6992d-99-KA-2	3	MR
IR9884-54-3-1E-P1	3	MR	IR33353-64-1-3-1	3	MR
IR15865-430-3-1-3	3	MR	IR36	5	S

[a]Scored using 0-9 scale of *Standard evaluation system for rice.* [b]R = resistant, MR = moderately resistant, S = susceptible.

Reaction of IR varieties to the brown planthopper (BPH) population in Raipur, Madhya Pradesh, India

D. J. Pophaly and D. K. Rana, Entomology Department, Indira Gandhi Krishi Vishwa Vidyalaya, Raipur, Madhya Pradesh, India

Twenty-one IR varieties were tested against a BPH *Nilaparvata lugens* population in a glasshouse at Raipur in 1991.

Ten-d-old seedlings of those varieties, susceptible check TN1, resistant check PTB33, and ASD7 and Mudgo were infested with 4- to 6-d-old BPH nymphs. We rated the injury of each seedling when more than 90% of the TN1 were dead.

Only IR62 and IR64 are resistant, IR34, IR36, and IR56 are moderately