Entries were sown on 10 Apr and transplanted on 10 May, at 13- × 13-cm spacing, 10 hills/row, 2 rows/variety, with three replications.

In late May, all plots were infested with 50 first-instar larvae/ replication. Deadhearts were observed 1 mo after infestation.

Resistance to SB significantly differed between indica and japonica varieties. Indica varieties were more susceptible than japonicas. Of 31 japonica varieties, 79122 and Wu Fan-keng were moderately resistant, 21 varieties were tolerant, and 8 were moderately susceptible. All 16 indica varieties were moderately susceptible or susceptible. Differences in resistance between conventional varieties and hybrids were not significant.

At 40 d after infestation, average larvae survival, body length, and head width were 21%, 11.62 mm, and 0.94 mm, respectively, in japonicas and 45.34%, 13.52 mm, and 1.3 mm, respectively, in indicas. Lower larvae survival and shorter bodies are common characteristics on resistant varieties.

The diameter of the air cavity in the leaf sheath in moderately resistant 79122 (0.78 mm) was significantly smaller than that in susceptible Shanyou 63 (1.607 mm). The larger air cavity possibly favored larvae survival.

Amount of soluble sugar in the plant was 2.2-2.9% in moderately resistant varieties, and 3.83-4.83% in susceptible varieties. □

Resistance of rice germplasm to whitebacked planthopper (WBPH) in Changsha, China

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The WBPH *Sogatella furcifera* population on hybrid rice plants is usually higher than it is on conventional varieties. To find a source of WBPH resistance for hybrid rice breeding, we conducted seedbox screening tests of 1,777 rice accessions in the screenhouse 1986-88.

Pregerminated seeds were sown in 12-cm rows in 50- × 30- × 10-cm seedboxes. TN1 and N22 were the susceptible and resistant checks. At the 3- to 4-leaf stage, each seedling was infested with seven second- to third-instar nymphs by distributing insects uniformly on the seedbox. Plant damage was scored when susceptible check seedlings were about 90% dead.

Of 218 accessions showing resistance, 41 were resistant to both WBPH and BPH (see table). These lines and varieties can be used in breeding. The IR varieties that have also been identified as restorer lines for hybrid rice breeding will be used in that program. □

Lines and varieties resistant to WBPH and BPH in Changsha, China.

Line or variety	Scale[a]	
	WBPH	BPH
IR27280-39-2-2-3-2	0	1
IR29692-131-2-1-3	0	3
IR19661-3-2-2-3-1	0	3
IR21231-117-2-2	1	3
IR32420-130-1-3	1	3
IR28210-68-4-1-3-1	1	3
IR28251-85-1-2-3	1	3
IR25891-19-1-2	1	3
IR14497-15-2	1	3
IR19126-42-1	1	3
IR27208-102-3	1	3
IR28138-43-3-1-3-2	1	3
IR19672-195-2-2	1	3
IR21931-78-2-2	1	3
IR21817-50-2	1	3
IR18348-36-3-3	3	1
IR27300-124-2	3	1
IR24609-4-2-3-1	3	1
IR13525-118-3-2-2-2	3	1
IR19661-150-1-2-3-2	3	3
IR10781-75-3-2-2	3	1
IR13149-19-1	3	1
IR31802-56-4-3-3	3	3
IR31805-20-1-3-3	3	3
IR17494-32-1-1-3-2	3	3
Wnachyukuo	3	3
Bhusarisali Paddy	3	3
Fu 26-23	1	3
Pei hua Xuan-4	3	1

[a] *Standard evaluation system for rice.*

Molecular distillation of rice plants resistant and susceptible to whitebacked planthopper (WBPH)

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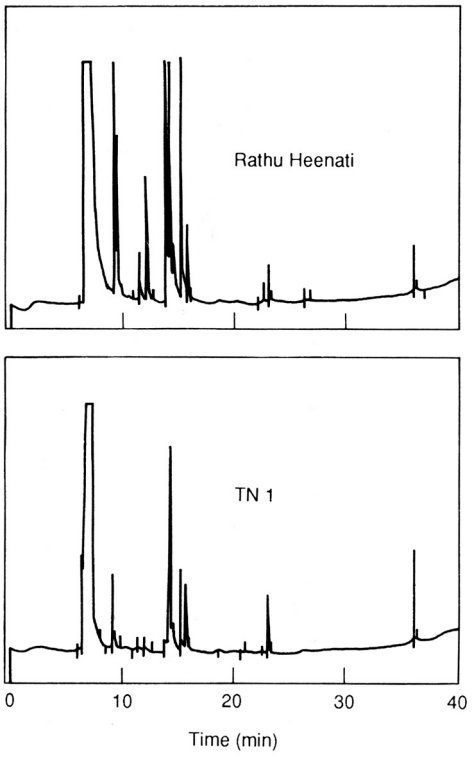
Attractants in susceptible rice plants and repellents in resistant plants play an important role in an insect's selection of host and establishment. We evaluated volatiles in molecular distillate extracts from WBPH-resistant Rathu Heenati and susceptible TN1 rice plants, using gas chromatography (GC).

Leaves and leaf sheaths of 7-wk-old plants were cut into 5-cm-long pieces and 100 g placed in a 500-ml glass container, with 3 replications/variety. The container was connected to one end of a 10-cm-long U tube. The other end was connected to a glass thimble, to collect distillate. A high vacuum valve was connected 5 cm above the thimble.

The sample container was immersed into a Dewar flask containing dry ice (acetone) for 20 min. The system was connected to a high vacuum line and air evacuated until the pressure inside the container reached 10^{-3} mm Hg. Then the high vacuum valve was closed, the Dewar flask transferred to the extract collector, and the apparatus left to equilibrate at room temperature for 24 h.

GC analysis was performed on a Varian 3700 GC equipped with a wide bore 60 m × 0.75 mm SPB-1 column. N was the carrier gas, at a flow rate of 3 ml/min. Injector and detector temperatures were set at 170 °C and heated to 250 °C, respectively. Oven temperature was programmed to increase from 50 °C for 2 min to



Gas chromatograms of molecular extracts from WBPH-resistant Rathu Heenati and susceptible TN1 rice plants. IRRI, 1988.

250 °C, at 5 °C per min. One μl of the extracts was used for analysis on the splitless mode.

The figure shows qualitative and quantitative differences between molecular distillate extracts of resistant Rathu Heenati and susceptible TN1. This may reflect different volatile composition of the odors produced by rice plants that influence the insect in-locating its host plant. □

Ptb 10 — a promising donor of gall midge (GM) resistance

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During the 1986 rainy season a severe epidemic of GM in Srikakulam District destroyed resistant varieties Phalguna and Surekha (derivatives of Siam 29). Grain yield losses were estimated at 50-90%. We evaluated certain potential new donors of resistance to the GM population of the district during 1988 rainy season at Panukuvalasa, a hot spot location.

Seven proven donors and two derivatives of Siam 29 were planted in six rows of 16 hills each at 15- × 15-cm spacing. GM incidence was recorded at 30 and 50 d after transplanting (DT) on hills and tillers from 20 preselected hills/entry.

Among the Ptb series, only Ptb 10 had no silvershoots (SS) (see table). The three other donors had 20-40% SS/hill at 50 DT.

Phalguna and Surekha, the predominant varieties of the north coastal district of A.P., had 95-100% SS/hill and 41-49%/ tiller at 50 DT. Susceptible check Jaya had 90 and 33%, respectively. Proven donors Siam 29 and Leuang 152 had 100% GM/hill and 24-30%/ tiller.

These results show the need to reorient the breeding programs for GM resistance, using Ptb 10 as one of the donors. □

Reaction of donors and derivatives to GM. A.P., India, 1988.

Designation	Parentage	GM incidence[a] (% SS)			
		30 DT		50 DT	
		HB	TB	HB	TB
Ptb 10	Donor	Nil	Nil	Nil	Nil
Ptb 18	Donor	20	1.45	20	2.07
Ptb 21	Donor	40	4.26	40	4.36
Ptb 33	Donor	20	2.18	20	3.67
Siam 29	Donor	45	4.93	100	24.52
Leuang 152	Donor	45	6.51	100	29.56
OB677	Donor	30	2.97	30	3.20
Phalguna	IR8/Siam 29	90	22.25	95	40.99
Surekha	IR8/Siam 29	65	7.31	100	49.07
Jaya (susceptible check)	TN1/IR8	70	9.16	90	32.69

[a]HB = hill basis, TB = tiller basis.

Excess water tolerance

Changes in shoot growth in response to partial submergence

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We tested tall and semitall rice varieties for growth and yield under normal and semideep water (55-60 cm) in a tank experiment during 1980 wet season (kharif). Seedlings (30-d-old) were transplanted in two tanks, with three replications. At 25 d after transplanting, one tank was flooded to 55-60 cm water depth, the other was kept at 5-10 cm. Plants were sampled at 20 and 45 d after submergence, flowering, and maturity.

At 20 d after submergence, 55-60 cm water reduced dry weight 23% and leaf area per tiller 58%. At flowering, they increased 41 and 26%, respectively (see table). Excess water significantly increased dry weight/ tiller at maturity. In almost all varieties, specific leaf weight (SLW) increased significantly at 20 d after submergence. Crop growth rate under 55-60 cm water was reduced by 50% 20-45 d after submergence, but increased during pre-anthesis (45 d after submergence to flowering) and post-anthesis (flowering to maturity).

Semitall Jagannath showed drastic reduction in shoot growth under 55-60 cm water, Janaki and CR1030 (tall) had maximum stability. □