each cage. Twenty-five days later, WBPH population was counted and progeny per female was computed.

Levels of resistance of monogenic cultivars with the five different genes were similar except in the population growth test, in which Podiwi A-8 (*wbph 4*) was least resistant and did not differ from susceptible TN1 (see table). WBPH resistance was not related to the number of genes for resistance.

IR2035-117-3 (*Wbph 1 + Wbph 2*) was the most resistant cultivar. High resistance level was indicated by low WBPH survival, long nymphal period, low growth index, low female weight, and low population growth. NP130, CI 5662-2, and ARC5752 have the same major genes for resistance, but were less resistant and for most growth parameters were equal to monogenic cultivars.

Results show that the levels of resistance of a cultivar cannot be predicted by studies of other cultivars with the same genes for resistance.

Development of WBPH on rice cultivars with different genes for resistance[a], IRRI, 1985.

Variety	Resistance genes	Adu1t survival (%)	Nymphal period (d)	Growth index	Female wt (mg)	Population growth (no. progeny/ female)
N2	2 *Wbph 1*	77 bcd	11.6 abcd	6.57 bcd	1.18 abc	19 ab
ARC10239	*Wbph 2*	63 abc	11.8 bcd	5.40 abc	1.44 cde	54 cd
ADRS	2 *Wbph 3*	67 abcd	11.5 abcd	5.85 bc	1.24 abcd	25 abc
Podiwi A-8	*wbph 4*	72 abcd	11.2 ab	6.41 bcd	1.59 e	89 e
N'Diang Marie	*Wbph 5*	71 bcd	11.1 ab	6.87 bcd	1.51 de	35 abcd
IR2035-117-3	*Wbph 1 + Wbph 2*	50 a	13.4 e	3.81 a	0.99 a	7 a
NP130	*Wbph 1 + Wbph 2*	80 bcd	11.4 abc	7.03 cd	1.38 bcde	28 abc
CI 5662-2	*Wbph 1 + Wbph 2*	17 bcd	11.3 abc	6.76 bcd	1.31 abcd	33 abcd
ARC5752	*Wbph 1 + Wbph 2*	68 abcd	12.0 cd	5.74 bc	1.28 ab	42 bcd
Chaia Anaser	*Wbph 1 + Wbph 3*	77 bcd	11.8 bcd	6.51 bcd	1.42 cde	63 de
Katuyjar Dhan	*Wbph 1 + Wbph 3*	59 ab	11.6 abcd	5.15 ab	1.33 bcde	64 de
Colombo	*Wbph 2* + 1 recessive	82 cd	12.2 d	6.70 bcd	1.09 ab	13 ab
368	*Wbph 1* + 1 recessive	68 abcd	11.8 bcd	5.83 bc	1.90 abcde	35 abcd
WC1240	*Wbph 1* + 1 recessive	65 abcd	11.7 abcd	5.51 bc	1.15 abc	27 abc
65	*Wbph 1* + 1 recessive	75 bcd	11.1 ab	6.76 bcd	1.44 cde	55 cd
274 A	*Wbph 1* + 1 recessive	65 abcd	11.4 abc	5.72 bc	1.25 abcd	39 abcd
TN1	– – –	85 d	11.0 a	7.71 d	2.04 f	88 e

[a] Separation of means in a column by Duncan's multiple range test at the 5% level. Av of 10 replications.

Although the varieties have the same major gene, they have diverse pedigrees and may have different sets of minor genes which greatly influence the resistance levels of these cultivars to the insect.

IET7575: a brown planthopper (BPH)-resistant variety for Karnataka, India

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In 1982 kharif, we screened 47 rices for field reaction to BPH at RRS, Mandya. In 1983 we screened promising entries of the 1982 trials. IET7575 (Sona/ Manoharsali) was resistant to BPH. In 1983 and 1984 kharif, verification trials were conducted in large plots with BPH-susceptible TN1 grown next to IET7575. TNI was hopperburned, but there were only 2-3 BPH/hill on IET7575.

IET7575 matures in 135 to 140 d. It has moderate tillering; broad, green leaves; late senescence; long slender grains without white belly; 2-wk seed dormancy; and good grain quality. With 100 kg N/ha, it yielded an average 6.8 t/ha. Trials conducted in farmer fields in BPH endemic areas confirmed its resistance to BPH. It also yielded more than popular high yielding varieties.

In summer and kharif 1984, IET7575 performed well in large BPH-prone areas in Channapatna (Bangalore District) and Maddur Talus (Mandya District). The State Department of Agriculture plans large-scale demonstrations to popularize the variety in Karnataka.

Virulence of *Nephotettix virescens* colonies on resistant rices

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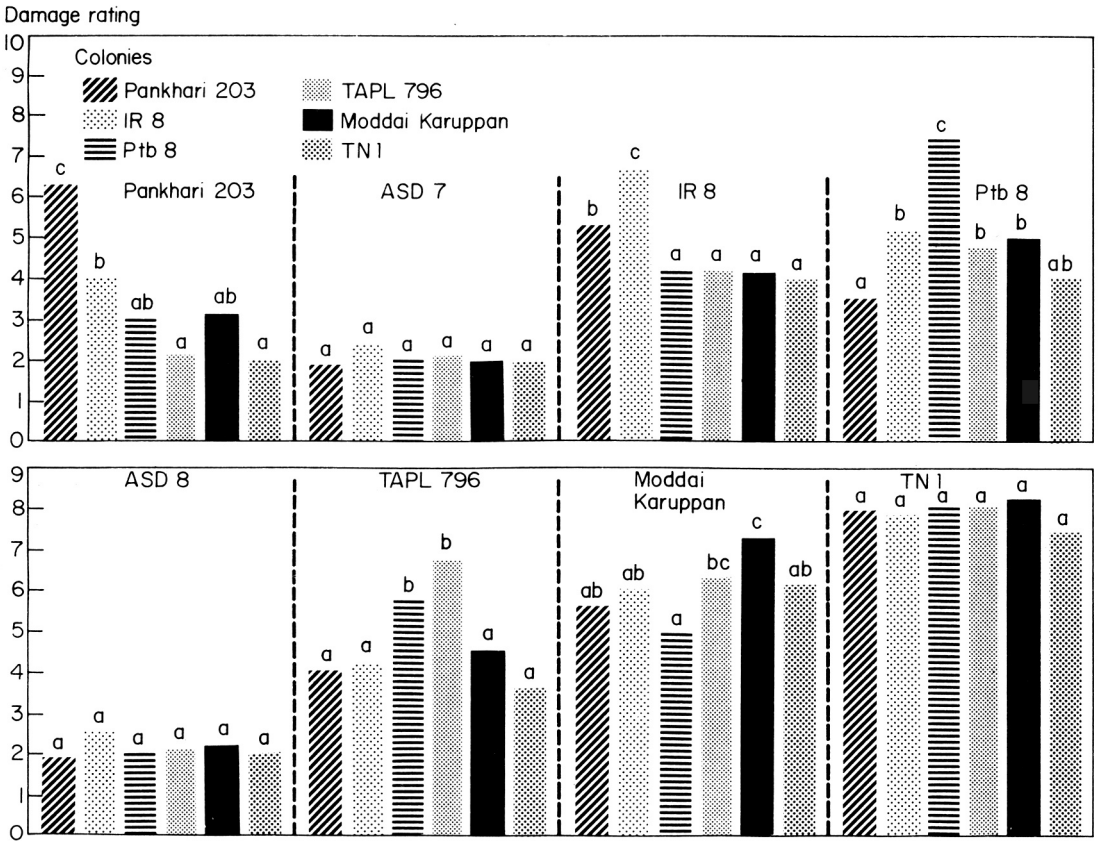
Colonies selected for virulence on rices with genes for resistance to *N.virescens* were compared with a colony reared on susceptible TN1 for 100 generations. Their virulence to ASD7, ASD8, and the varieties on which they were reared was studied to determine whether *N. virescens* populations can adapt to previously resistant varieties in the greenhouse.

Resistant varieties on which the insect colonies were reared were Pankhari 203 (*Glh 1* gene for resistance), IR8 (*Glh* 3). Ptb 8 (*glh 4*), TAPL, 796 (*Glh 6*), and Moddai Karuppan (*Glh 7*). The colonies were tested for virulence to Pankhari 203, ASD7 (*Glh 2*), IR8, Ptb 8, ASD8 (*Glh 5*), TAPL 796, and Moddai Karuppan. Virulence was determined by plant damage.

Twenty seeds/row per variety were sown in three replications. Seedlings were thinned to 151 row 6 d after seeding (DAS). At 7 DAS they were infested with three 2d- and 3d-instar nymphs/seedling from the respective colonies. Plant damage was recorded for 7 d beginning 5 d after insect infestation, using the Standard evaluation system for rice. Damage was calculated as the mean of seven ratings.

Colonies were most virulent to the varieties on which they were reared (see figure). Some colonies had cross virulence — IR8 on Pankhari 203. Pankhari 203 on IR8, and Ptb 8 on



Virulence of *N. virescens* colonies on resistant rices, IRRI. For each cultivar, means with a common letter are not significantly different at the 5% level by DMRT.

TAPL 796. None were virulent to ASD7 or ASD8.

Results indicate that *N. virescens* can adapt to resistant varieties in the greenhouse. This also may happen in the field. With this result, the stability of resistance of a variety in the field can be predicted. The cross virulence observed on some colonies suggests that *N. virescens* can adapt to varieties with different genes for resistance.

Genetic Evaluation and Utilization

HYBRID RICE

Wei You 64 — an early duration hybrid for China

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In 1979, several elite rice lines with multiple disease and insect resistance were introduced in China through the China-IRRI collaborative program on hybrid rice. They were intended for use as improved restorers for hybrid rice development.

In 1980, test crosses were made with the cytoplasmic-genetic male sterile line V20A in China and at IRRI. Evaluation of nursery results identified IR9761-19-1 as an effective restorer. The F_1, V20A/IR9761-19-1, was more productive than its male parent.

In 1981 dry season, the lines were again crossed at IRRI and the F_1 was evaluated at four sites in Hunan and at IRRI in wet season. At all sites, fertility restoration was complete and the hybrid matured earlier than the restorer.

Chinese scientists purified the restorer line and produced enough seeds of IR9761-19-1 with plant selection 64 (IR9761-19-1-64) to evaluate in 1981 replicated yield trials. The results were encouraging. In 1981-82 winter season, hybrid seeds were grown on 3.3 ha on Hainan Island. Mean seed yield was 2.2 t/ha. In 1982 second season, the combination was reevaluated in replicated yield trials and on-farm trials in Hunan and compared to the commercial hybrid Wei You 6 (V20A/IR26). V20A/IR9761-19-1-64 matured 2 wk earlier and yielded about 1 t/ha more than Wei You 6 (Table 1).

Seed was multiplied in Hunan and Hainan and 6,500 ha of the new hybrid was grown in summer 1983 in Hunan,