Table 3. Average number of spores produced by type 4 lesions on 4 rice varieties inoculated with 2 blast isolates and incubated for 36 and 72 hours, from counts at 4 inoculation intervals.

Days after inoculation	Spores (no./m × 1000)											
	Isolate 2017						Isolate 7506					
	Tetep		KTH		IR442		IR36		KTH		IR442	
	36 h	72 h	36 h	72 h	36 h	72 h	36 h	72 h	36 h	72 h	36 h	72 h
6	0.60	0.40	0.02	0.08	0.26	0.28	2.90	1.06	3.28	2.16	1.06	0.54
7	0.28	0.14	0.78	1.02	0.46	0.06	–	–	–	–	–	–
10	0.04	0.10	0.30	0.44	0.28	0.58	–	–	3.48	3.44	1.46	1.28
19	0.24	0.42	0.68	0.36	–		–	–	1.22	0.40	0.30	0.81

isolates (Table 1). IR36 had fewer and smaller lesions than IR442 and KTH, indicating that number of lesions and size of lesions may be components of horizontal resistance to rice blast (Table 1, 2). The variety had no effect on spore production of either isolate of the blast fungus, indicating that sporulation capacity is not a component of horizontal resistance, but is a reproductive function of the blast fungus. That is further supported by the fact that lesion size did not affect the number of spores per lesion (Table 3).

Reaction of indica and japonica rices to blast in Taiwan

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Five uniform blast nurseries were established yearly from 1974 to 1978 to test rice varieties and selections from various breeding stations for blast reaction in Taiwan. Four were on the western coast (Yilan, Nantou, Chiayi, Pingtung) and one in the east (Taitung). The program was jointly conducted by the Taipei, Taichung, Chiayi, Kaohsiung, and Taitung stations with the assistance of the Joint Commission on Rural Reconstruction.

Among the 693 entries were 499 japonicas and 194 indicas. Thirty-four percent of the entries showed resistance to leaf blast; 55%, to neck blast. Fifteen and 48% of the japonicas and 75 and 84% of the indicas were resistant to leaf and neck blast, respectively. Japonica varieties generally appear more sensitive to leaf blast; indicas have more overall blast resistance than japonicas under local conditions.

A positive relationship existed between leaf and neck blast reactions (correlation coefficients were 0.77 for japonicas, 0.64 for indicas, and 0.79 when pooled). All correlations were significant at the 1% level indicating varieties resistant to leaf blast were resistant to neck blast, but a smaller *r* value for indicas may lead to exceptions.

Of 35 varieties being commercially produced (28 japonicas, 7 indicas), only 8 (3 japonicas, 5 indicas) were resistant to both neck and leaf blast. Among the susceptible were two leading varieties, Tainan 5 and Tainung 67; the two were. planted on 384,000 ha in 1978 (51% of Taiwan's total planted areas). Chianung 242, until recently one of Taiwan's most popular resistant cultivars, was also susceptible. ■

GENETIC EVALUATION AND UTILIZATION

Insect resistance

Comparison of oxalic acid concentration in rice varieties resistant and susceptible to the brown planthopper

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Resistance to the brown planthopper (BPH) in certain rice varieties is mainly governed by chemicals in the phloem tissues that inhibit sucking. To test oxalic acid for its potential in inhibiting sucking by BPH, we isolated it from leaf sheath extracts of Mudgo, a resistant variety. We compared the oxalic acid concentration in the following 28 rice varieties, with special reference to differences in their varietal resistance to BPH.

- Susceptible varieties: IR8, IR20, IR22, IR24, TN1
- Resistant varieties with:

Bph 1 gene – IR26, IR32058-78, Mudgo, CO 10, MTU15

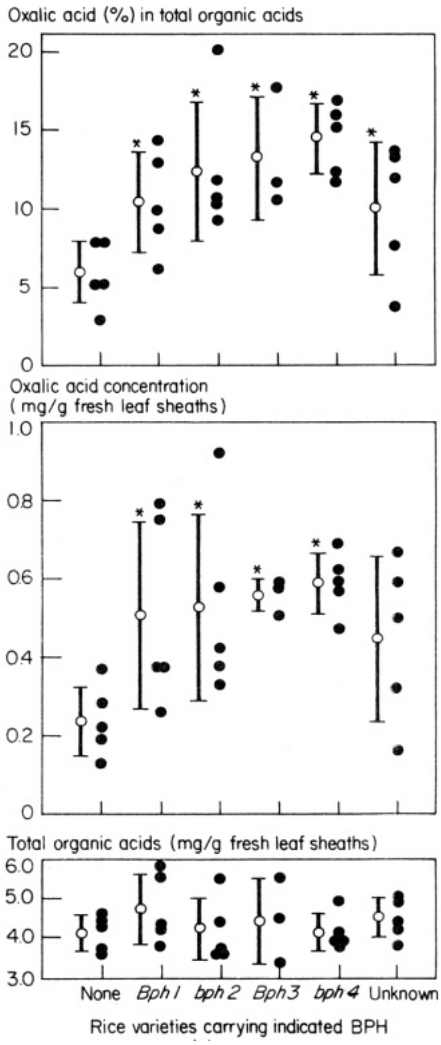
Bph 2 gene – IR32, H5, H105, CR94-13, ASD7

Bph 3 gene – Kuruhondarwala, Gangala, Rathu Heenati

Bph 4 gene – Heenhoranamawee, Babawee, Lekam Samba, Kalukuruwee, Kahata Samba

Unknown gene(s) – PTB21, PTB33, Sudu Hondarwala, Sinna Sivappu, Balamawee

Organic acids were separated from 70% EtOH extracts of fresh leaf sheaths from 40-day-old plants using ion exchange chromatography through Amberlite CG120 and Amberlite



Oxalic acid and total organic acid contents in rice varieties carrying different BPH resistance genes. ● = values for individual varieties; ⊢○⊣ = means and S.E. for each group of varieties; * = significantly higher means than the mean of susceptible varieties.

CG-4G. The quantitative measurement of oxalic acid was facilitated by gas-liquid chromatography after organic acids were methylated with diazomethane reagent. Although the varieties had almost identical total contents of organic acids (4.1-4.7 mg/g fresh leaf sheaths), the susceptible and resistant groups had significantly different oxalic acid concentrations (see figure). In susceptible varieties the average concentration of oxalic acid was 0.18 mg/g fresh tissue. In the 5 groups of resistant varieties, it was 0.34 to 0.45 mg/g fresh tissue. Similarly, the total organic acids in susceptible varieties contained significantly less oxalic acid (4.4%) than those in resistant varieties (7.6-11.0%,), suggesting that oxalic acid is a chemical Factor governing varietal BPH resistance in rice. But this possibility must be ascertained through experiments that examine the differential oxalic acid concentrations in the phloem sap — the dietary source of the BPH — between susceptible and resistant varieties. ■

Whitebacked planthopper attacks before introduction of new rice varieties in Pakistan

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Reports say that the whitebacked planthopper (WBPH) became a serious rice pest in some areas of Pakistan only after the new varieties were introduced. But in 1953 — before the introduction of new rices — this writer was personally involved in the large-scale survey and control of a severe WBPH attack in the Sind. Dr. T. Ahmad reported the survey during the Sixth Commonwealth Entomological Conference in London in 1954. He noted a 60% loss to the WBPH in Sind in 1952 — a fact that corrects the impression that the new rice varieties are solely to blame for pest attack. ■

Screening for resistance to *Rupela albinella* in Guyana, South America

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Two species of stem borers attack rice in Guyana: *Rupela albinella* Cr. and *Diatrea sacharalis* F. R. albinella, or the white stem borer, is the more important. It occurs year-round throughout Guyana because of continuous cropping.

Twenty-seven cultivars were assessed for resistance to *R. albinella* at the Rice Research Station, Burma, Guyana, in the 1978 spring crop. A random sample of 40 tillers/cultivar was studied to ascertain infestation. Host plant resistance was determined by the percentage of tillers infested, and the number of egg masses, larvae, adults, deadhearts, and whiteheads per cultivar.

No rice tested showed total resistance, but three rices had high resistance (0–15% infestation) (see table). Moths showed distinct differences in ovipositional preferences for some cultivars. But the number of egg masses per cultivar was not correlated with the number of deadhearts or whiteheads. Plants with larvae or even holes through which adult stem borers emerged showed no whiteheads. Contrary to other reports, multiple infestation by 2 live larvae/internode was observed. ■

Reaction of cultivars to *Rupela albinella* Cr. in the field. Burma, Guyana, 1978.

Cultivar	Infestation (%)
Bluebelle	95
Champion	88
916-58	72
Starbonnet	70
406-20	68
Cica 9	62
GR 271	60
Rustic	55
GR277	50
IR22	42
GR281	42
Ciwini	42
704-36	42
4444	42
BG79	42
Ceysvoni	40
"S"	38
4440	38
GR280	35
"T"	30
78708	30
Cica 7	22
698-72	21
704-80	20
"N"	15
Camponi	10
698-71	8

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