Table 1. Soil incorporation of fungicides to control ShB on UPLRi 4 under lowland conditions.[a] UPLB, Philippines.

Fungicide	Rate (kg/ha)	Disease severity (%)	Yield[b] (t/ha)
Iprodione 50% WP	1	71.0	4.6 a
Benomyl 50% WP		74.9	4.5 a
Benomyl-EMDOC[c]	1	77.7	4.1 a
Benomyl-iprodione	1	72.9	4.1 a
Triphenyltin acetate 60% WP-triphenyltin hydroxide 50% WP	1	71.8	3.6 a
Triphenyltin acetate iprodione	1	74.8	4.1 a
PCNB	50	87.3	4.3 a
No fungicide (control)	-	90.0	3.7 a

[a] Mean of 10 plants/treatment in 3 replications. [b] Sampling area for yield was 1 m^2. Means followed by the same letter are not significantly different at the 5% level. [c] Ethyl 3-(3-5 dichlorophenyl)-5-methy1-2-4 deoxo-5-oxazoldine carboxylate (Serinal 50% WP).

Table 2. Soil incorporation of controlling ShB on UPLRi 5 under upland conditions.[a] UPLB, Philippines.

Fungicide	Rate (kg/ha)	Disease severity (%)	Yield[b] (t/ha)
Iprodione 50% WP	1	47.0	3.4 a
Benomyl 50% WP	1	50.7	3.1 a
Benomyl-EMDOC[c]	1	44.4	2.1 a
Triphenyltin acetate 60% WP-triphenyltin hydroxide 50% WP	1	48.8	2.9 a
PCNB	50	51.1	2.9 a
No fungicide (control)	-	57.7	2.4 a

[a] Mean of 10 plants/treatment in 3 replications. [b] Means followed by the same letter are not significantly different at the 1% level. Sampling area for yield was 1 m^2. [c] Ethyl 3-(3-5 dichlorophenyl)-5-methyl-2-4 deoxo-5-oxazoldine carboxylate (Serinal 50% WP).

conditions during the 1983 wet season. Varieties were UPLRi 4 for upland and UPLRi 5 for lowland. Upland treatments (six) and lowland (eight) were in a randomized complete block design with three replications. Upland plots measured 2 × 3 m with 20 cm between rows; lowland plots were 2 × 2 m with 20- × 20-cm spacing. Fungicides were incorporated into the plots, and fields were planted the day after treatment. Plants were inoculated 45 d after fungicide application. Rice grain-hull culture of *Rhizoctonia solani* 3-4 wk old was inserted between tillers and between plants. Disease readings were taken 2-3 d before harvest on 10 random plants/plot and severity computed:

$$\text{disease severity} = \frac{\text{sum of disease rating}}{\text{total no. of rating} \times 9} \times 100$$

Under lowland conditions, all treatments except PCNB had significantly less disease than the control (Table 1). Under upland conditions, plots treated with iprodione and benomyl-EMDOC had significantly less disease than the control (Table 2). In both situations, PCNB had the highest disease rating and disease severity. Iprodione and benomyl, singly or in combination, seem to control disease, although yields did not show significant differences. □

Diseases of dry summer rice in eastern Uttar Pradesh, India

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Rice in the eastern part of Uttar Pradesh is mainly grown in the hot wet season 1 Jun-30 Nov. However, some farmers plant a small part of their holdings to rice during the hot dry season 1 Feb-15 Jun. Seedlings are raised while temperatures are still low. Although mainly dependent on irrigation, the crop occasionally receives one or two mild showers. It is harvested before the normal rainy season begins.

We surveyed farmers' fields in different districts and university experimental rice plots at Faizabad for incidence and severity of diseases in 1986 and 1987.

We identified bacterial blight (BB) caused by *Xanthomonas campestris* pv. *oryzae* (Ishiyama) Dye, bacterial leaf streak (BLS) caused by *Xanthomonas campestris* pv. *oryzicola* (Fang et al) Dye, brown spot (BS) caused by *Helminthosporium oryzae* Breda de Haan, *khaira* induced by Zn deficiency, sheath blight (ShB) caused by *Rhizoctonia solani* Kuhn, and sheath rot (ShR) caused by *Sarocladium oryzae* (Saw.) Gams (see table). Incidence and severity of the diseases varied from cultivar to cultivar and field to field in both years. BB and ShR occurred consistently and, depending on conditions, severely. □

Incidence and severity of major diseases in hot season rice in eastern U.P., India, 1986-87.

Disease	Disease incidence[a] (%)	Disease score[b]
BB	10-80	3-9
BLS	0-20	1-5
BS	0-20	1-3
Khaira	0-15	2-5
ShB	0-10	1-3
ShR	10-60	5-7

[a] Based on percent leaves (BB, BLS, BS), percent culms (ShB, ShR), and percent plants (khaira) infected/unit area. [b] *Standard evaluation system for rice,* 1980.

Virulent strain of rice grassy stunt virus (GSV) identified in Indonesia

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An unidentified rice disease showing tungro (RTV)-like symptoms was noticed in Java in 198 1. We used a serological assay and transmission test to confirm its causal agent, a virulent strain of GSV.

Latex suspensions sensitized with antisera to GSV, rice tungro bacilliform virus, and rice tungro spherical virus were obtained from IRRI. GSV was detected by the latex test only in leaf samples collected from plants showing RTV-like symptoms at Cianjur, West Java. None of the samples reacted positively to antisera against the RTV-associated viruses.

Laboratory colonies of brown planthopper (BPH) *Nilaparvata lugens* and green leafhopper (GLH) *Nephotettix virescens* were given 1-2 d access feeding on diseased plants collected at Cianjur. The test insects were transferred to healthy Cisadane seedlings for 1-d inoculation feeding immediately after acquisition feeding and after a 9-d incubation. Only BPH that had 9-d incubation transmitted the disease (see table). Transmission by BPH also was confirmed using artificially inoculated source plants,

Seedlings inoculated at 7 d developed stunting and pale-green to pale-yellow discoloration 6–14 d after inoculation. Later symptoms consisted of striping or mottling on the second and third leaves from the youngest, rusty spots on lower leaves, and narrowing and shortening of leaf blades. Drying started from the tips of leaves before chlorosis spread over a whole leaf. Additional N failed to retrieve infected plants.

Most infected plants died 19-75 d after inoculation. Tiller numbers in diseased plants were not significantly different from check until 30 d after inoculation. Plants that did not die produced numerous small tillers. Leaves with symptoms responded positively, but not consistently, to iodine.

Seedlings inoculated at 30 d exhibited uniform RTV-like orange-yellow discoloration on the third leaves at early stages of infection. Neither stunting nor narrowing of leaves was conspicuous in 20 d after inoculation. However, later symptoms were not markedly different from those in 7-d-old seedlings.

These results show that the infectious agent is a virulent strain of GSV. A recent field survey found the strain occurring widely in Central Java. ☐

Transmission of a virulent strain of GSV by BPH and GLH.[a]

Source plant	Insect	Inoculation: Insects/ seedlings	Inoculation: Incubation period (d) after feeding on source	Plants inoculated (no.)	Plants infected (%)
Field collected	GLH (2d instar)	30/10	0	30	0
	BPH (2d instar)	30/10	0	30	0
	BPH (2d instar)	1/1	9	60	23.3
Greenhouse infected	BPH (2d instar)	30/10	9	40	7.5
Greenhouse infected	GLH (adult)	1/1	0	30	0
	GLH (adult)	1/1	9	30	0
	BPH (2d insty[b])	10/1	9	9	22.2

[a]Insects were allowed an acquisition access feeding of 1 or 2 d and then were given a l-d inoculation access to 7-d-old seedlings after no or 9-d incubation period. [b]Seedlings inoculated at 30 d.

Insect management

Influence of carbofuran dose and time of application on control of rice water weevil (RWW)

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The RWW *Lissorhoptrus brevirostris* affects 10-28% of the land planted to rice in Cuba, and it is the most difficult insect pest to control.

Different levels of carbofuran 5% G (0.6-1.9 kg ai/ha) were broadcast before sowing (test 1) and 25 d after germination (DAG) (test 2).

Three plants of variety J-104 were sown in 12-cm-diameter clay pots. In test 1, they were inoculated with 20 RWW adults/pot 20 DAG. In test 2, 20 first-instar larvae/pot were inoculated the day after insecticide application.

All levels of carbofuran controlled RWW adults and larvae. Control was greater when carbofuran was applied 25 DAG than when it was broadcast before sowing (see table).

In the field, the insect shows similar behavior in respect to the time of invasion.

Application must be done when larvae are leaving the leaf sheath after hatching; that is the stage most susceptible to insecticides. ☐

Effect of different levels of carbofuran 5% G on RWW.[a] **Sancti-Spiritus, Cuba.**

Dosage (kg ai/ha)	Adult mortality (%) 2 DAI	Adult mortality (%) 14 DAI	Larvae mortality (%) 10 DAI
0.6	72	82	98
0.8	70	88	98
0.9	68	84	98
1.1	68	86	96
1.5	70	88	100
1.9	74	88	100
Check	2	2	0

[a]Av of 4 replications. DAI = days after inoculation.

Effect of neem seed bitters (NSB) on green leafhopper (GLH) survival and rice tungro virus (RTV) transmission

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A reduction in phloem feeding by GLH *Nephotettix virescens,* the vector of RTV disease, is observed in plants with foliar or systemic application of NSB. RTV is phloem-specific. We evaluated RTV transmission efficiency of GLH feeding on NSB-treated plants.

Two-week-old TN1 seedlings were treated by 24-h root immersion or sprayed with 2,500 ppm NSB. Untreated seedlings were used as check. Each seedling was placed in a 15- × 1.5-cm test tube covered with nylon mesh and arranged by treatment.

Newly emerged GLH females reared on virus-free TN1 plants were allowed a 3-d acquisition feeding on source plants. One viruliferous GLH was transferred to each tube. One day after infestation