Effect of N and carbofuran on GM and SB infestation, Badeggi, Nigeria, 1984 wet season. [a]

Treatment	GM damage (% onion shoots)	SB-damaged stems (%)	Yield components and total yield		
			Tillers/hill	Panicles/hill	Yield (t/ha)
N level (kg/ha)					
0	4.2 a	35.3 a	7.3 b	6.8 b	2.59 a
50	4.6 a	36.4 ab	8.8 a	8.1 a	2.12 a
100	4.8 a	39.3 bc	9.5 a	8.7 a	2.13 a
150	1.2 b	40.1 c	9.8 a	8.7 a	2.82 a
Carbofuran application [b] (1.0 kg ai/ha)					
1	6.0 cd	39.7 b	9.3 a	8.4 a	2.19 a
30	4.7 abc	31.6 ab	8.1 a	7.5 a	2.71 a
60	5.6 bcd	38.3 ab	9.3 a	8.7 a	2.58 a
1 and 30	3.6 a	35.3 a	9.3 a	8.1 a	2.88 a
30 and 60	4.1 ab	34.5 a	8.6 a	7.7 a	2.83 a
Untreated	7.2 d	41.0 b	8.5 a	1.3 a	2.51 a

[a] Separation of means in a column by DMRT at the 5% level. [b] Days after transplanting.

stems from 20 hills/plot at 10 d before harvest.

GM and SB damage increased with applied N, but the number of tillers/hill and panicles/ hill did not increase significantly beyond 0 kg N/ha. Yield did not differ significantly at different N levels (see table).

Applying carbofuran significantly influenced GM and SB damage. Applying carbofuran at 1 and 30 DT significantly reduced GM damage. SB damage was significantly reduced with applications at 1 and 30 DT or 30 and 60 DT. There were no significant differences in yield components or total yield (see table).

Effect of insecticides and variety on stem borer (SB) incidence

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We studied the effect of some insecticides and varieties on SB incidence at Badeggi in 1983 wet season. The field trial was in a split-plot randomized block design with four replications. Twenty-one-day-old FARO 11 and FARO 13 seedlings were transplanted in 25-m^2 plots at 25- × 25-cm spacing. Insecticides were applied 10, 30, 50, and 70 d after transplanting (DT). Deadhearts due to *Diopsis thoracica* infestation in each plot were recorded 40 DT. Bored stems from *Maliarpha separatella* infestation were assessed by dissecting 20 randomly selected hills from each plot at 10 d before harvest (see table).

Carbofuran controlled *D. thoracica* most effectively, followed by BHC and decamethrin. Number of bored stems did not significantly differ among insecticide treatments. Carbofuran-treated plots had significantly fewer borers per plant than other plots, and yield was significantly higher.

FARO 11 had more deadhearts than FARO 13, but the difference was insignificant. FARO 11 had significantly more borers per plant.

Effect of insecticides and varieties on SB incidence, Badeggi, Nigeria, 1983 wet season.

Treatment			Deadhearts 40 DT (%)	Bored stems at harvest (%)	Borers (no/20 hills)	Grain yield (t/ha)
Insecticide	Formulation	Rate (kg ai/ha)				
BHC	20 EC	2.00	9	22	32	3.3
Decamethrin	2.5 EC	0.50	9	20	29	3.3
Diazinon	60 EC	2.00	21	22	28	2.1
Isoprocarb	75 WP	1.33	13	21	20	2.6
Carbofuran	10G	1.00	4	19	13	3.9
Control			17	22	32	2.8
LSD (P=0.05)			10	ns	10	0.6
Variety						
FARO 13			10	19	19	3.3
FARO 11			14	23	33	2.9
LSD (P=0.05)			ns	2	6	ns
Interaction (P=0.05)			14	ns	ns	ns

Influence of N fertilizer on the population development of brown planthopper (BPH)

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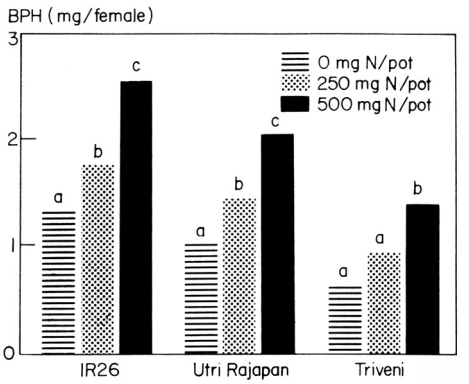
We studied BPH *Nilaparvata lugens* biotype 2 reactions to different levels of N fertilizer on selected rices. BPH reared on IR26 were tested on susceptible IR26; Utri Rajapan, tolerant with no antibiosis; Triveni, moderate tolerance and antibiosis; and IR60, high antibiosis.

The N solution was prepared by mixing 125 g of ammonium sulfate containing 20% N in 375 ml water. In each of 2 clay pots lined with polyethylene bags and containing 2.5 kg



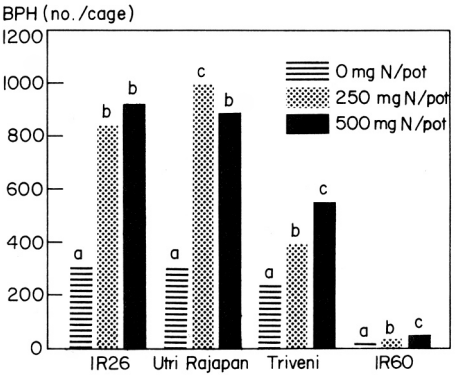
1. BPH weight on selected varieties grown under different N fertilizer rates, IRRI.

rice soil, we mixed 5 ml or 10 ml of the fertilizer solution corresponding to 250 mg and 500 mg N/ pot, or 100 and 200 kg N/ ha. A clay pot with no applied N was the control. Treatments were replicated seven times, with one pot as a replication.

Three 7-d-old seedlings were transplanted in each pot. At 20 d after transplanting (DT), potted plants were covered with mylar film cages and infested with 20 newly hatched BPH nymphs per cage. After 18 d, or when insects reached adulthood, all but 3 pair (male and female, randomly selected) of BPH were removed. The six were left to develop a population in each cage. The insects removed from the cages were collected in vials, oven dried, and individually weighed. Because survival on IR60 was very low, no weights were recorded. For the population growth test, BPH reared on IR26 plants in a separate cage were used to reinfest IR60 at 3 pair/ cage.

To determine the effect of BPH feeding rate at different N levels, one seedling was planted in a clay pot. At 30 DT, we recorded honeydew excretion (mm^2) by 5 adult females on filter paper treated with bromocresol green.

BPH weight (Fig. 1), feeding rate, and population growth (Fig. 2) increased with N application on IR26, Utri Rajapan, and Triveni. Population growth on IR26 and Utri Rajapan, without antibiosis, increased threefold with added N, and twofold on moderately resistant Triveni (Fig. 2). On IR26, Utri Rajapan, and Triveni, weight per female increased at both 250 and 500 mg N/ pot. Although IR60 was highly resistant at the high N level and the BPH number remained low, the population doubled with applied N.



2. BPH population development on selected varieties grown under different N fertilizer rates, IRRI.

Insecticides to control thrips and caseworm in rice nurseries

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Thrips *Stenchaetothrips biformis* (Bagnell) and caseworm *Nymphula depunctalis* (Guen.) severely damage rice seedlings. We evaluated seed treatment and soil application of insecticides before and after sowing for their control. CR1009 was planted in 4-m^2 plots. Thrips population was recorded on 10 randomly chosen seedlings/ plot at 20 and 30 d after sowing (DAS). At 30 DAS, percent caseworm damage was recorded for 10 seedlings/ plot based on total leaves and damaged leaves.

Broadcasting carbofuran 3 G at 0.5 kg ai/ ha before sowing and at 10 DAS controlled thrips most effectively. Broadcasting carbofuran at 10 DAS controlled caseworm most effectively (see table).

Control of thrips and caseworm in rice nurseries, Tamil Nadu, India, 1984. [a]

Treatment	Thrips (no./seedling)		Caseworm (% damaged leaves)
	20 DAS	30 DAS	30 DAS
Seed soaking [b] in chlorpyriphos, 0.2% for 3 h	0.5 c	0.9 bcd	12.0 b
Seed soaking [b] in chlorpyriphos, 0.1% for 3 h	0.4 bc	0.8 abcd	15.0 bc
Broadcasting carbofuran 3 G, 0.5 kg ai/ ha before sowing	0.1 a	0.4 ab	10.3 ab
Broadcasting phorate 10 G, 1.0 kg ai/ ha before sowing	0.2 ab	1.2 cd	12.3 b
Broadcasting carbofuran 3 G, 0.5 kg ai/ ha at 10 DAS	0.2 ab	0.3 a	4.8 a
Broadcasting phorate 10 G, 1.0 kg ai/ ha at 10 DAS	0.2 ab	0.6 abc	19.0 c
Untreated check	0.4 bc	1.3 d	13.5 bc
CD (0.05)	0.3	0.5	5.6

[a] Values are means of 4 replications. DAS = days after sowing. Means in a column followed by a common letter are not significantly different at 5% level. [b] 12 ml (0.2%) and 6 ml (0.1%) of chlorpyriphos 20 EC used in 1.2 liters of water for soaking 1.0 kg seed.

Insect pests of early season rice nurseries in the Imphal Valley

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In the Imphal Valley, cold weather prevents germination of rice seed in Feb

Varietal response to root aphid *Rhopalosiphum rufiubdominalis* (Sasaki) in winter rice nurseries, Imphal, India.

Variety	Aphid burns	
	No.	Area [a] (%)
Prasad (IR1561-2166)	8a	2 (7.99)
Punshi (IR661-1-140-3-2/Phouren)	8 ab	2 (7.87)
P-33 (TNl/Basmati 370)//(Ratna)	9ab	3 (9.13)
RCM-1 (Moirangphou/Jaya)	11 b	4 (1 1.06)
CH-1039	17 c	8 (16.52)
CD (P=0.05)	3	3

[a] Values in the parentheses are arc sin percent transformation. Means followed by a common letter are not significantly different.