appropriate management decisions.

We set up a trial to determine possible effects of sweep-net sampling on rice yields. IR62, IR64, and IR1917-3-17 were transplanted 20 d after seeding at 25 × 25 cm. Each field was divided into 24 6.25- × 8.3-m plots. Four treatments were replicated six times in a randomized complete block design.

We sampled weekly for 3 consecutive weeks starting at 67 d after transplanting (DT), making 1, 3, or 6 passes through a plot. The sampler made 10 sweeps/ pass.

There was no significant difference in yields of IR64 from the different sweep-net pass patterns (see table). However, sterile spikelets at harvest should be evaluated. From 0 to three passes through IR62 did not significantly affect yields, but 6 passes did. Yield of IR1917-3-17 decreased with 3-6 passes. One pass through the field did not significantly affect yield of any variety. □

Effect on yield of sweep-net sampling for 3 consecutive weeks beginning 67 DT. IRRI, 1987.

Passes through the plot (no.)	Yield[a] (t/ha)		
	IR62	IR64	IR1917-3-17
0	3.7 a	3.8 a	3.2 a
1	3.2 ab	3.6 a	3.2 a
3	3.2 ab	3.7 a	3.0 b
6	3.0 b	3.6 a	2.8 b

[a] Av of 6 replications. In a column, means followed by a common letter are not significantly different at the 10% level by DMRT.

Leaffolder (LF) outbreak in Haryana

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LF *Cnaphalocrocis medinalis* (Guenée) has been observed in most rice-growing areas of Haryana, but its incidence has been below the economic threshold. Our regular pest monitoring surveys now show that since 1983, LF has started to cause significant damage to the rice crop. A severe outbreak was observed during 1987 kharif (Jul to mid-Oct).

We surveyed extensively during 1987 to monitor LF in the major crop areas—Kurukshetra, Karnal, Ambala, Jind, Sirsa, and Sonepat. Peak incidence was in mid-September when rice was at the panicle emergence stage. In 13 of 145 villages surveyed, 1-5% leaves were found damaged; in 28 villages, 5-25%; in 44 villages, 50%; and in 60 villages, more than 50%. Populations ranged from 2 to 20 larvae/hill. PR106 and Basmati 370 were the most affected rice varieties.

The nitrogenous fertilizer recommendation for these ricefields is 100-140 kg N/ ha. Excessive application of nitrogenous fertilizer, coupled with indiscriminate application of granular pesticides and other formulations, could have resulted in resurgence.

Average monsoon rainfall is 500-750 mm during kharif. But in 1987 kharif, unprecedented drought Jul-Oct could have affected the insect population. □

Acoustic signal-producing organ of brown planthopper (BPH)

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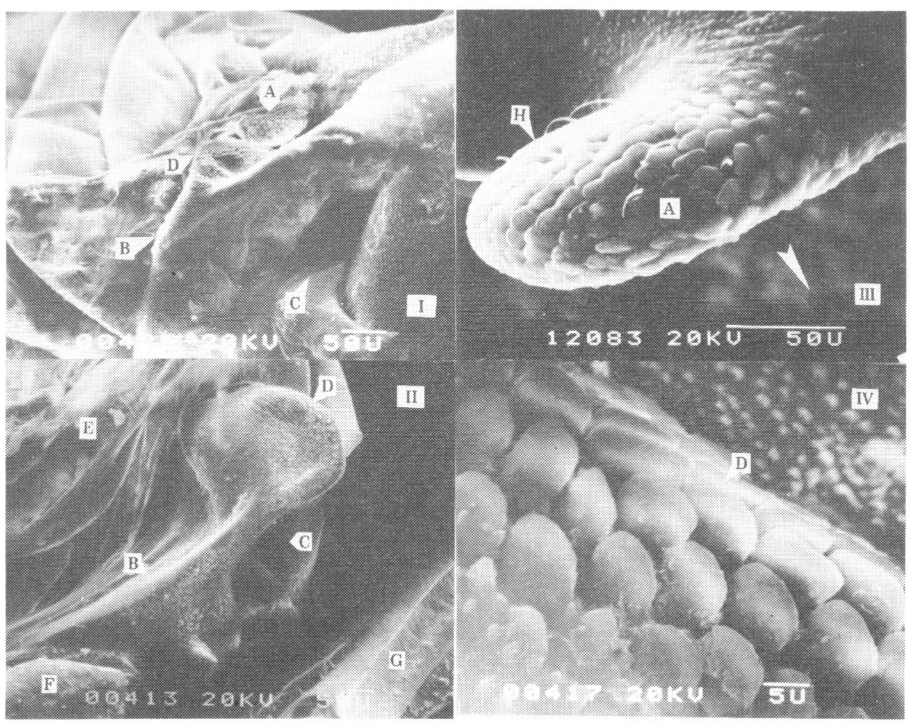
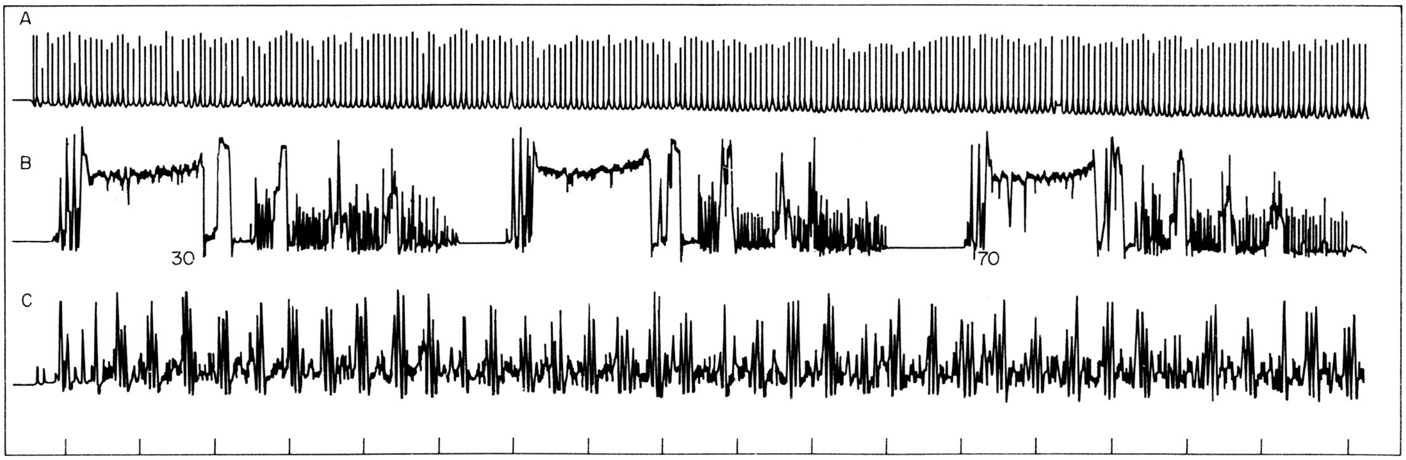
Prior to copulation, both male and female adults of the rice BPH communicate primarily by means of acoustic signals emitted by specialized signal-producing organs. We investigated the structure and function of those organs.

The signal-producing organ (possessed only by the adults) is situated on both sides of the juncture of the pterothorax and abdomen (Fig. 1). It is composed of a sclerotizing coxata and a petal-like sclerite extended in the front of the third sternopleuron (the first and second sternopleuron are under-developed and invisible). The underside



1. I. Acoustic signal producing organ of *N. lugens* in lateral view. II. Coxata in posterior view. III. Petal-like sclerite in the front of third sternopleuron in anterior view, arrow points upward. IV. Flaky processes on the top of coxata. A = petal-like sclerite, B = coxata, C = a hole before coxata, D = the top of coxata covered with flaky processes, E = pterothorax, F = trochantin, G = femur, H = underside of the sclerite.



2. Acoustic courtship signals of *N. lugens.* A. Female (macropterous or long-winged) signal. B-C. Male (macropterous or long-winged) signal. Time marks at 1-S intervals, RC: 0.007 s.

of the sclerite and the top of coxata are densely covered with rectangular chitinous scales.

As a calling adult slightly vibrates its abdomen in a dorsoventral direction, the sclerite rubs against the top of the coxata. The acoustic signal emitted is a series of clicks or discrete sound pulses (Fig. 2).

This signal-producing mechanism was verified in an experiment where adults with the two friction surfaces topically glued were unable to call.

The wave pattern, pulse repetition frequency, and sonic spectrum of the signals are closely related to the abdominal action and acoustic characteristics of the insect body. There is, however, no significant variation in those aspects between macropters and brachypters.

The acoustic signal is transmitted through the substrate of the host plant, making it possible for a small insect such as BPH to transmit a faint audio-frequency signal; transmitting efficiency is much higher than through air. The legs, and sometimes the feeding stylet, are believed to be the connection from the insect to the host plant for transmission and reception. No special hearing organ has been found, even under scanning electron microscope. Perhaps BPH responds to the signals through tactile sensations in its legs.

Several species of other common planthoppers — *Sogatella furcifera* (Horvath), *S. longifurcifera* (Esaki et Ishihara), *Laodelphax striatellus* (Fallen), *Nilaparvata bakeri* (Muir), *N. muiri* China, *Paracorhulo sirokata* (Matsumura et Ishihara), *Toya propinqua neopropinqua* (Muir), and *Saccharosydne procerus* (Matsumura)— have similar acoustic signal-producing organs. BPH is considered to be representative of delphacids. ☐

Occurrence of flour mite *Acarus siro* Linn. in rice mills

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A. siro (*Tyroglyphus furinae* Linn.), a polyphagous flour mite, was reported for the first time in milled rice samples collected from storage godowns in Cuttack, Puri, and Balasore districts of Orissa 1984-86. We examined 25-g samples under stereoscopic binocular microscope to determine mite population (eggs, juveniles, and adults). Grain moisture content of each sample was measured by the Oswa Universal Moisture Meter.

Stored rice harbored a range of mite populations, depending on storage period, rice variety, and grain moisture. Mite populations showed significant differences among four test varieties— CR1014, Ratna, Jaya, and Pusa 2-21 (see table).

The mite occurred in almost all samples collected from 10 rice mills. Mite populations increased significantly across storage from 6 to 24 mo. Grain moisture of the samples ranged from 16 to 19%, considered a congenial moisture range for mite multiplication. In addition, the mite was found in such rice products as bran and suji (powdered rice) stored in godowns of the mills. ☐

Population of flout mite in milled rice. Orissa, India, 1984-86.

Storage period (mo)	Mites[a] (no./25-g sample)			
	CR1014	Ratna	Jaya	Pusa 2-21
6	86 a	73 a	65 a	39 a
12	158 b	139 b	128 b	47 ab
18	183 bc	152 bc	148 c	110 c
24	284 d	228 d	253 d	149 d

[a]Mean of 20 samples. Means followed by a common letter are not significantly different at the 5% level by DMRT.