the lowest population; cartap and decamethrin + buprofezin had moderate populations. Ethoprofos granules applied 20 DT did not restrict WBPH multiplication at booting; populations on that plot were higher than in the control.

Insecticides applied 70 DT significantly reduced WBPH populations. Carbofuran (1.0 kg ai/ ha) and cartap (1.5 kg ai/ha) were most effective, followed by decamethrin + buprofezin (0.09 kg ail ha) and chlorpyrifos (0.5 kg ai/ha) spray. □

Residues of monocrotophos in rice

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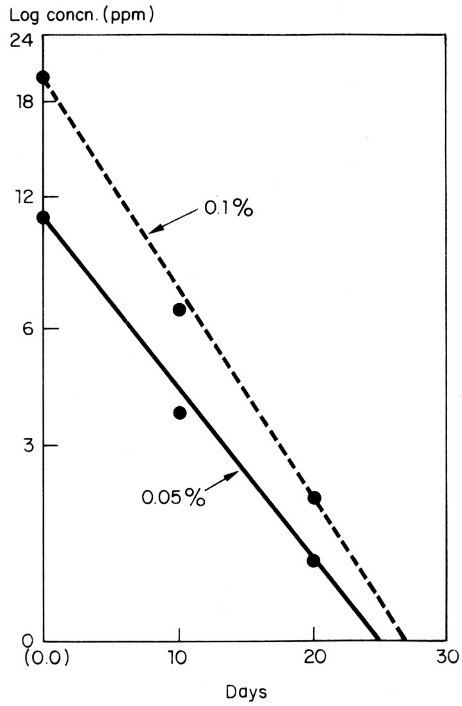
We studied residues of monocrotophos (3-[dimethoxy phosphinyl oxy]- *N* -methyl-cis-crotonamide), a common pesticide, in rice variety Lalat (ORS26-2014). The pesticide was sprayed at the recommended level (0.05%, or 0.25 kg ai/ ha) and double the recommended level (0. 1%, or 0.50 kg ai/ ha). Triplicate plant samples were collected at 0, 10, 20, and 30 d after spraying and at harvest.

The spectrophotometric method was used to estimate residues of monocrotophos, using p-nitrobenzyl pyridine as the chromogenic reagent. Recovery of monocrotophos from fortified samples was 83.2-84.5%.

Mean initial residues of 10.97 ppm (0.05%) and 19.91 ppm (0.01%) were reduced to 3.26 and 5.19 ppm 10 d after pesticide application, to 1.14 and 2.11 ppm 20 d after application, and to nondetectable levels 30 d after application. Dissipation was 89.5% for both application levels 20 d after application.

Rate of degradation with both application levels seemed to follow the first-order reaction (see figure). Fifty percent of the toxicant was reduced at



Linear plot of first-order reaction of monocrotophos in rice. Bhubaneswar, India.

2.4 d at 0.05% application level and at 2.3 d at 0.1%. The safe waiting period (T_{tol}) was 17.8 d and 19 d.

Grain and straw samples had nondetectable levels of monocrotophos. □

Preliminary observations on *Entomophthora delphacis*

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The pathogen *E. delphacis* of brown planthopper (BPH) *Nilaparvata lugens* is an important entomogenous fungus widely distributed in irrigated ricefields of South China. It attacks mainly BPH, whitebacked planthopper, and small brown planthopper. It also infects zigzag striped leafhopper and green leafhopper (GLH).

E. delphacis usually are most abundant during the overcast and rainy season. in later growth stages of long-duration rice. Infection percentages reach 70-80% when temperatures are 10-20 °C (day-night) with relative humidity more than 90%. In the Changsha region, the numbers of BPH infected by *E. delphacis* ranged from 37% to 64%. In 1985, a year of high humidity, infection reached 69.7%. In 1986, a dry year, infection was only 27.3%.

We used a fungus suspension on artificial media and naturally infected insects for bioassay to determine virulence on BPH and GLH in the laboratory. Results are presented in the table. Mortality of naturally infected insects was higher than that of artificially infected insects. □

Virulence of *E. delphacis* in the laboratory. Changsha, China.

Pathogen source	Insect tested	Insects (no.)	Mortality (%) after infection		
			2 d	4 d	6d
Natural	BPH	139	22.8	53.3	68.3
	GLH	92	18.0	32.4	61.1
Artificial [a]	BPH	120	6.3	18.4	31.2
	GLH	120	2.7	11.3	24.3
Control (water)	BPH	110	1.8	1.8	2.7
	GLH	73	2.7	2.7	2.7

[a] Sabouraud's agar + egg yolk.

Toya spp. planthopper incidence on *Brachiaria mutica*

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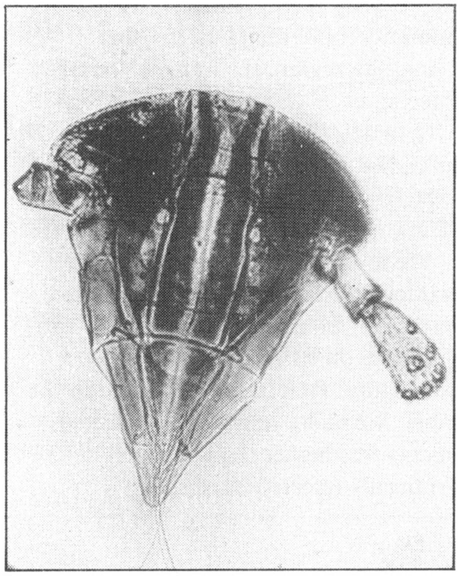
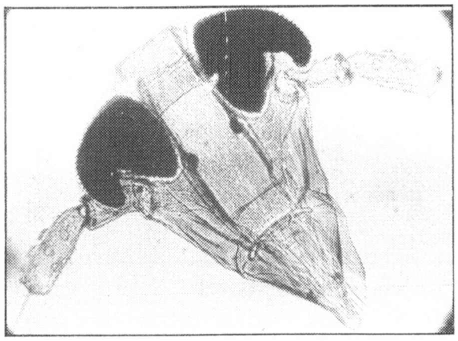
Brachiaria mutica, cultivated in about 15 ha at the Annamalai University Sewage Farm, exhibited severe hopperburn symptoms in Feb 1986 and again in Oct. Investigations revealed abundant numbers of a planthopper.

The delphacid resembles brown planthopper (BPH) *Nilaparvata lugens,* except that it is smaller. Both brachypterous and macropterous forms were seen in large numbers Oct-Dec 1986: smaller numbers are seen throughout the year.



1. Head of the planthopper, showing the characteristic vertical bands.



2. Head of the BPH.

The head of the planthopper shows vertical black bands on the frons (Fig. 1). These appear to be its characteristic feature, and are not seen in BPH (Fig. 2). The ventral side of the abdomen in the 4th- and 5th-instar nymphs shows a pair of distinct black spots laterally on either side near the 5th segment.

Specimens have been identified as *Toya* spp. by CAB International Institute of Entomology, London.

Although ricefields adjacent to the Sewage Farm were not infested with this planthopper, adult females caged after 5 h of starvation on 40-d-old IR50 rice seedlings were found to thrive for the next 56 h.

Usually, the planthopper moves more swiftly than BPH, but becomes less active after a starvation period. Insects regain their natural poise after a few hours on rice plants, indicating possible force-feeding. Actual feeding experiments on rice seedlings showed a mean weight of 7.0 mg honeydew/adult as against 22.7 mg on the regular host. No survival occurred among 40 freshly hatched nymphs confined on 35-d-old IR50 rice seedlings.

After 56 h on rice plants, the insects had oviposited an average 26 eggs/ insect, in batches of 6-9 eggs. □

Chemical control of thrips *Stenchaetothrips biformis* in the rice nursery

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Spray formulations of phosphamidon, monocrotophos, phosalone. chlorpyrifos, metasystox, endosulfan, dimethoate, and neem oil were evaluated for control of rice thrips in the rice nursery. The field experiment with nine treatments including control was laid out in a randomized block design with three replications.

Pregerminated seeds of IR20 were sown in 0.5-m^2 plots. Thrips infestation was noticed 10 d after sowing and pretreatment counts were taken on 15 randomly selected seedlings. Counts were taken at 24, 48, and 72 h, and 1 wk, and 2 wk after treatment.

All chemicals were significantly effective in controlling thrips (see table). Chlorpyrifos, dimethoate, and monocrotophos were best. Although neem oil did not reduce thrips population significantly 24 h after application, it did reduce population at 48 and 72 h after application. □

Effect of insecticides for thrips control.[a] Coimbatore, India.

Treatment	Population[b] (no.)						
	Pretreatment	24 h	48 h	72 h	1 wk	2 wk	Mean
Phosalone (0.07%)	5.9	0.2 ab	0.9 ab	0.4 a	1.4 b	4.5 d	1.7 b
Chlorpyrifos (0.04%)	5.1	1.1 ab	0.9 b	0.7 abc	0.7 a	1.2 a	0.9 a
Monocrotophos (0.04%)	6.6	0.9 a	0.3 a	0.4 a	1.5 b	3.1 c	1.2 a
Metasystox (0.04%)	6.9	1.7 b	0.6 ab	0.5 ab	1.8 b	3.4 c	1.6 b
Dimethoate (0.04%)	5.2	1.2 ab	0.6 ab	0.5 a	0.6 a	1.9 b	0.9 a
Phosphamidon (0.04%)	5.4	1.7 b	0.9 b	0.9 abc	0.9 abc	3.6 c	1.8 b
Endosulfan (0.05%)	5.4	2.5 c	1.6 c	1.0 c	1.9 c	4.8 d	2.4 c
Neem oil (2.0%)	5.7	4.9 d	1.8 c	1.4 d	2.3 c	4.3 d	2.9 d
Control	5.7	4.8 d	5.8 d	6.4 e	7.6 d	7.8 e	6.5 e
Period mean		2.2 b	1.5 a	1.4 a	2.2 b	3.8 c	

[a]Mean of 45 seedlings. [b]In a column, means followed by a common letter are not significantly different by DMRT at the 5% level. In a row, means followed by a common letter are not significantly different by DMRT at the 5% level.

Alternate ricefield hosts of the Angoumois grain moth

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The Angoumois grain moth *Sitotroga cerealella* is an important pest of rice, wheat, barley, millet, and maize. Field infestation is carried to storage, where is causes severe losses in quality and quantity.

Field infestation on different hosts can identify source of inoculum for rice and other cereals. In places where rice is grown in a particular season, the pest may survive on alternate hosts in other seasons to reinfest the next rice crop.