Linear correlations of false smut (*Ustilaginoidea virens*) disease incidence (percent panicles with false smut) on 32 rice cultivars and plant and environmental factors.

	Correlation coefficient (r)[a]
Plant	
Plant height (cm)	-0.54*
Days to 50% flowering	0.095**
Environment[a]	
Maximum temp[d] (28.1°C)	-0.048
Minimum temp (20.1°C)	-0.040
Relative humidity (87.8%)	-0.321
Rainfall (1.4 mm)	-0.120
Cloudiness (1.74 h)	-0.176
Disease severity	
Number of false-smutted florets on the panicle with maximum infection	0.81*

[a] P (0.05) = 0349*. [b] Av of 32 d during flowering.

cant. Correlations with environmental factors during flowering (22 Aug-29 Sep) were negative and nonsignificant (see table).

Among cultivars, the positive correlation (r = 0.81) of number of smutted florets on the panicle with the most infected florets and percent false smutted panicles was significant. The relationship between number of smutted florets on the panicle with the most infected florets and percent panicles with false smut (regression coefficient $y = 1.26 + 0.763\ x$) shows that, in assessing disease severity, one disease severity factor can be used to estimate another factor. ■

Bakanae and foot rot of rice in Punjab, Pakistan

L. K. Khokhar, National Agricultural Research Centre, Crop Diseases Research Institute, Islamabad, Pakistan

During a 1989 survey of rice crop diseases in Sialkot, Gujranwala, and Sheikhupura of Punjab Province, Basmati 385 growing in isolated farmers' fields showed symptoms similar to those of bakanae disease. Some of the plants had yellowish green, thin leaves and exhibited abnormal stem elongation, lower tillering, and rotting at the root-stem joint as well as at the first node.

Laboratory examination revealed the presence of *Fusarium moniliforme* Sheld., the imperfect stage of *Gibberella fijikuroi* (identified on the basis of micro and macro conidia, micro conidiophores, and micro conidial chains). A pathogenicity test to fulfill the requirements of Koch's postulates confirmed *F. moniliforme* to be the causal organism.

This is the first report of this disease in Pakistan. ■

Efficacy of ethofenprox in preventing rice tungro (RTV) infection

N. V. Krishnaiah and A. Ghosh, Directorate of Rice Research, Rajendranagar, Hyderabad 500030, India

RTV transmitted by green leafhopper (GLH) *Nephotettix virescens* is one of the important diseases of rice in many parts of India. We studied the efficacy of ethofenprox (a new ether-derived insecticide similar to synthetic pyrethroids) against GLH and RTV transmission.

Potted TN1 plants in controlled greenhouse conditions were sprayed with ethofenprox. At 0.01%, ethofenprox killed 78% of confined viruliferous adults within 30 min; plants sprayed with 0.01% recorded significantly lower RTV infection than plants sprayed with 0.05% monocrotophos (see table). GLH mortality within 30 min and RTV transmission were related; GLH mortality after 30 min was not related to RTV transmission. ■

Effect of ethofenprox and monocrotophos on green leafhoppers and RTV transmission.[a]

Insecticide	GLH mortality (%)				RTV infection (%)
	0.5 h	1.0 h	4.0 h	24 h	
Ethofenprox 0.01%	78 a	87 a	95 a	100 a	53 a
Monocrotophos 0.05%	22 b	58 a	93 a	100 a	80 b
Untreated control	0 c	0 b	0 b	2 b	100 c

[a] In a column, means followed by the same letter are not significantly different at the 5% level by DMRT.

Integrated pest management–insects

Mutual interference among wolf spider adult females

K. L. Heong and E. G. Rubia, Entomology Department, IRRI

In ricefields, wolf spiders *Lycosa pseudoannulata* respond to high densities of prey, particularly brown planthopper (BPH) *Nilaparvata lugens* (Stål). This increases the chances that spiders will encounter each other while hunting for prey. That may decrease searching efficiency per predator and increase a tendency toward aggression, cannibalism, and outward dispersal. Such encounters between searching predators are often called "mutual interference."

We conducted laboratory experiments to measure mutual interference among wolf spiders and to determine the effect of hopper density on encounters between spiders. Freshly emerged BPH adult females were placed inside mylar cages (19-cm diam, 55-cm ht) with 5 tillers of TN1 potted rice plants at densities of 5, 10, 20, 30, and 60 BPH/cage. They were exposed to 1, 2, or 3 freshly emerged adult female wolf spiders for 24 h. There were 5 replications.

Searching efficiency per spider, a, over the experimental period was computed as

$$a = 1/P\ 1n\ [N/(N-N_a)]$$

where a is searching efficiency, P is predator number, N is initial number of BPH, and N_a is number of BPH attacked Log of a was plotted against log of P to obtain a linear regression. The resulting relationship of this linear mode1 is

$$\log a = \log Q - m \log P$$

where Q and m are constants, characteristic of the predator.

Regression analysis of the linear model log a = log Q - m log P in different prey densities.

PH density	Parameter estimate[a]			
	m + s.e.	log Q	F	P
5	0.439 ± 0.283	0.322	2.40	0.14*
10	0.556 ± 0.243	0.268	5.23	0.03*
20	0.103 ± 0.206	0.251	0.25	0.63[ns]
30	0.486 ± 0.191	0.242	6.46	0.02*
60	0.707 ± 0.122	0.288	33.63	<0.01**

[a]ns = not significant, * = significant at p = 0.05, ** = significant at p = 0.01.

For BPH densities of 5 and 20, the regression was not significant It was significant for BPH densities of 10, 30, and 60 (see table). Mutual interference appears to intensify with increase in prey density. The *m* values for BPH densities of 10 and 30 were not significant, but *m* was significantly large for the BPH density of 60. This means that the spiders aggregate at higher hopper densities increasing the chances of encountering each other. At low hopper densities, the spiders disperse to about one spider/plant, and there is less chance that spiders will encounter each other.

We observed some cannibalism, especially in cages with three spiders. ■

Fluctuation of yellow stem borer (YSB) populations in Raichur, Karnataka, India

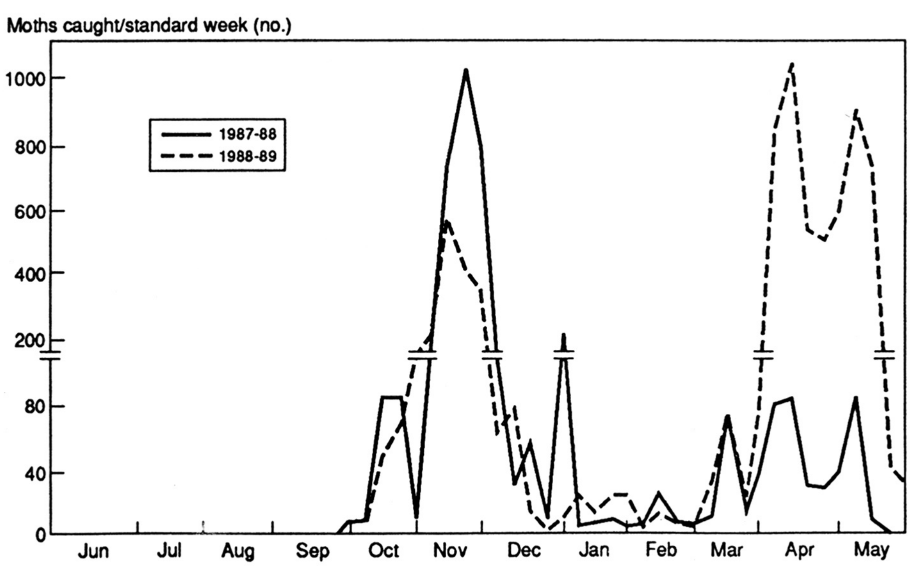
B. S. Nandihalli, B. V. Patil, and P. Hugar, Entomology Department, University of Agricultural Sciences, Raichur 584101, Karnataka, India

We used a modified Robinson model light trap with 160-W mercury lamp 1987-88 and 1988-89 to generate information on population fluctuations of YSB *Scirpophaga incertulas* (Walker) to use in the integrated pest management program.

Two peak activity periods were observed both years (see figure). The first peak was Oct-Dec: moths caught per standard week ranged from 9 to 1,015 in 1987 and 4 to 559 moths in 1988.

The second peak was Mar-May: moths caught ranged from 4 to 82 in 1988 and 26 to 1,042 in 1989. The insect was inactive Jun-Sep both years. More moths were caught Mar-May 1989 because canal water supply for the rice crop was low and most farmers did not apply plant protection measures.

These findings suggest that YSB counts to evaluate the need for crop protection measures should be made in the field the first week of Oct for wet season and during the first week of Mar for summer crops. ■



Population fluctuation of YSB *Scirpophaga incertulas* (Walker). Karnataka, India, 1987-89.

Toxicity of insecticides to mirid bug predator of rice brown planthopper

P. R. Srinivas and I. C. Pasalu, Entomology Department, Directorate of Rice Research, Rajendranagar, Hyderabad 500030, A.P., India

We tested 10 selected commercial formulations in the glasshouse for their toxicity to the predator *Cyrtorhinus lividipennis* (Reuter). Insecticide formulations were prepared with distilled water and sprayed (using a fine atomizer) to the runoff stage on potted 30-d-old TN1 plants. Control was distilled water only. Adult mirid bugs (30/treatment) were caged on the plants 4 h after spraying and mortality recorded 18 h later.

Synthetic pyrethroids cypermethrin, fluvalinate, and fenvalerate were highly toxic to the mirid bug (LC_{50} values of 0.00036, 0.0045, and 0.0053, respectively) (see table). Quinalphos also was toxic (0.008 LC_{50}). The insecticides methomyl and ethofenfox were relatively safe (LC_{50} values of 0.024 and 0.041, respectively). The remaining insecticides exhibited moderate toxicity. ■

Toxicity of insecticides (LC_{50} values) to mirid bug.

Insecticide	LC_{50}	Range
Cypermethrin	0.00036***	0.00039-0.00017
Fenvalerate	0.0053**	0.007 -0.004
Fluvalinate	0.0045**	0.006 -0.0033
BPMC	0.0073**	0.0094 -0.0057
Quinalphos	0.008**	0.010 -0.006
Chlorpyrifos	0.0095**	0.012 -0.008
Furathiocarb	0.0117**	0.0152 -0.0091
Monocrotophos	0.0129**	0.0163 -0.0102
Methomyl	0.024*	0.0299 -0.0194
Ethofenprox	0.0406*	0.0456 -0.036

[a]* = log * 10^3; ** = log * 10^4; *** = log * 10^5

Feeding and food assimilation by two species of rice leaffolders (LF) on selected weed plants

M. L. P. Abenes and Z. R. Khan, IRRI-ICIPE Project, IRRI

Several weed plants present in the ricefields are reported to be alternate hosts for rice LF. We studied the feeding rates and