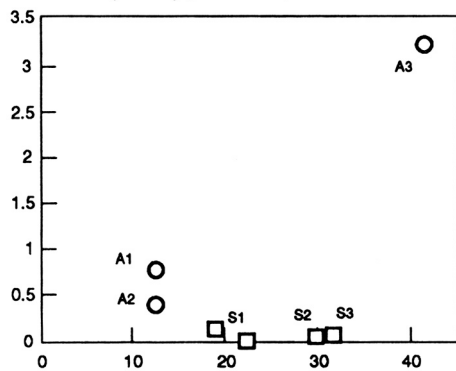


Natural enemy density (total / 5 hills)



2. Relationship between pest and natural enemy density in Arisol (A) and Sindri (S), in 3 successive samples (1, 2, and 3).

Species composition and seasonal occurrence of rice green leafhoppers (GLH) in Nepal

G. Dahal and F. P. Neupane, Plant Pathology and Entomology Departments, Institute of Agriculture and Animal Sciences (IAAS), Rampur, Chitwan, Nepal

Rice GLH *Nephotettix virescens* and *N. nigropictus* were collected from ricefields and nurseries at six sites in Chitwan and one site each in Bara (Parwanipur) and Janakpur (Hardinath) Districts of Nepal. In Saradanagar and Mangalpur, Chitwan, samples were collected at 2- to 3-wk intervals Apr-Oct 1989; in the remaining four sites, samples were collected once, during the fourth week of Aug 1989.

Each sample consisted of insects captured by an insect net in 30-40 horizontal sweeps in an arc approximately 1 m wide. At IAAS, a general-purpose black-light insect survey trap with a fluorescent 15-W bulb was set up very close to a ricefield and operated down to dusk. Leafhoppers were trapped and counted at about 1-mo intervals Jun-Dec 1989.

Composition of *N. virescens* and *N. nigropictus* collected at most sites varied considerably: numbers of *N. virescens* were much higher. The ratio of *N. virescens* to *N. nigropictus* varied from 13.8 to 41.0; the highest ratios were in Parwanipur (Bara) and Sripur (Chitwan) and the lowest in Hardinath (Dhanusha)

Table 1. Species composition, and population density of *Nephotettix* spp. collected by net sweeps in ricefields in Chitwan, Bara, and Janakpur Districts of Nepal, Aug 1989.

Locality	District	Leafhoppers ^a (no.)				Ratio ^b
		<i>N. virescens</i>		<i>N. nigropictus</i>		
		Range	Mean ± SD	Range	Mean ± SD	
Sripur	Chitwan	4-16	8.2±4	0-2	0.2	41.0
Gopalganj	Chitwan	3-6	4.6±1	0	0	
Shivnagar	Chitwan	5-15	8.3±3	0	0	
Jaynagar	Chitwan	7-50	18.0±16	0	0	
Saradanagar	Chitwan	7-28	11.9±5	1-3	0.5±1	23.8
Mangalpur	Chitwan	7-25	12.8±5	0-4	0.4±1	32.0
Parwanipur	Bara	7-132	89.4±22	1-5	2.2±.9	40.6
Hardinath	Dhanusha	3-6	8.3±1	2-3	0.6±1	13.8

^a Seven to ten net-sweeping surveys of 30-40 strokes was standard at each collection site. ^b *N. virescens*:*N. nigropictus*.

Table 2. Population of *N. virescens* and *N. nigropictus* captured by net-sweeping in ricefields at Saradanagar and Mangalpur, Chitwan, Nepal, Apr-Oct 1989.

Collection date	Leafhoppers collected/30-40 sweeps (no.)							
	Mangalpur				Saradanagar			
	<i>N. virescens</i>		<i>N. nigropictus</i>		<i>N. virescens</i>		<i>N. nigropictus</i>	
	Range	Mean ± SD	Range	Mean ± SD	Range	Mean ± SD	Range	Mean ± SD
22 Apr	0-1	0.14±3	0-1	0.43±.5	0-1	0.2 ± .4	1-3	1.7±1
9 May	1-2	2.00±1	0	0.00	0-3	1.1 ± .7	0	0
24 May	0-1	0.10	0	0.00	-	-	-	-
8 Jun	-	-	-	-	0	0.00	0	0
15 Jun	-	-	-	-	1-4	2.3 ± 1	0	0
22 Jun	-	-	-	-	0-1	0.75±.4	0	0
29 Jun	-	-	-	-	2-8	5.30±2	0	0
6 Aug	1-16	5.00±4	0	0.00	1-3	2.50±2	0	0
21 Aug	7-28	1.90±5	0-1	0.46±.9	7-25	12.80±5	1-4	0.40±.2
9 Sep	10-95	47.80±6	0-5	1.60±5	12-52	36.5 ± 6	2-5	3.10±1
9 Oct	61-139	99.90±5	2-8	3.80±4	198-355	274.4 ± 4	1-8	5.90±.5

(Table 1). Irrespective of site, the overall ratio of *N. virescens* to *N. nigropictus* was 41.0.

Populations of *N. virescens* and *N. nigropictus* varied, depending on site and time of collection. At all sites, *N. virescens* was much more numerous than *N. nigropictus* (Table 2). The population of *N. virescens* was larger in Parwanipur than in Hardinath and Chitwan.

In monthly sweep-net catches at Saradanagar and Mangalpur, Chitwan, GLH numbers ranged from 0 to 355. The population increased sharply in Aug-Sep, peaked during Oct-Nov, and sharply declined in Dec.

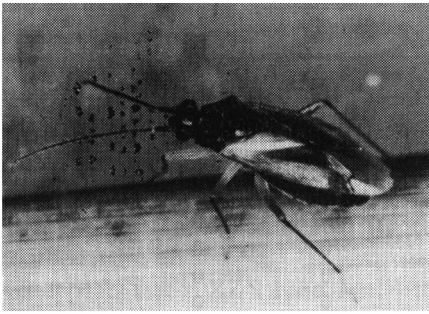
N. nigropictus populations fluctuated at low levels at all sites, but was highest in Parwanipur. At Saradanagar and Mangalpur sites, the population had two

peaks: the first in May, with a population decline Jun to mid-Aug, then another increase from Aug to peak again Sep-Oct, then a sharp decline. ■

Brown mirid bug, a new predator of brown planthopper (BPH) in the Philippines

R. P. Basilio and K. L. Heong, Entomology Division, IRRI

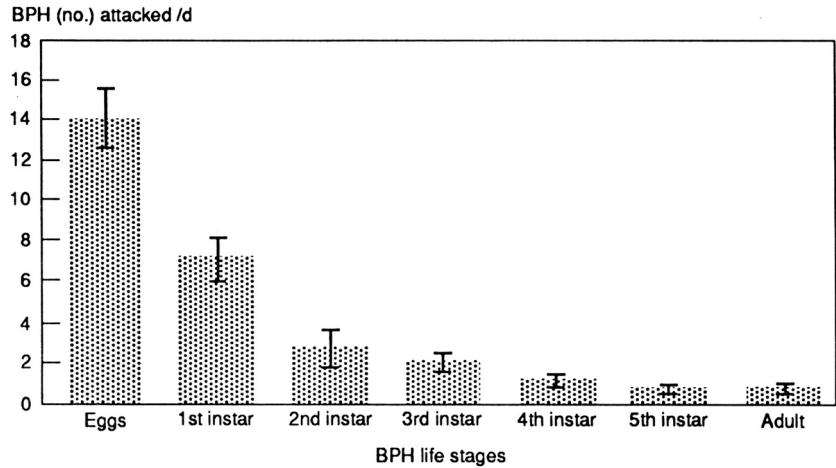
Three species of mirids have been reported as important predators of rice planthoppers. In the Philippines, *Cyrtorhinus lividipennis* has been well discussed. Recently, a species belonging to the genus *Tytthus* was found surviving on BPH colonies in the greenhouse. It is



1. Adult female *Tyththus* sp.

the same size as *C. lividipennis*. While *C. lividipennis* is green, *Tyththus* sp. is yellowish green when young and brown when mature (Fig. 1).

Inside the plant tissues, *Tyththus* sp. lay eggs that hatch in 8-9 d ($\bar{X} = 8.75 \pm 0.11$). The nymphal period is 13-16 d, with five instars: I = 2-4 d ($\bar{X} = 2.18 \pm$



2. Mean numbers of BPH attacked by *Tyththus* sp. brown mirid bug. Vertical lines on bars represent standard error.

0.13). II = 2-5 d ($\bar{X} = 3.75 \pm 0.28$), III = 2-4 d ($\bar{X} = 2.69 \pm 0.17$), IV = 2-4 d ($\bar{X} = 2.77 \pm 0.19$), V = 2-4 d ($\bar{X} = 3.00 \pm 0.13$).

The female adults attack BPH eggs at an average 14 eggs/d, with a maximum of 32 eggs (Fig. 2). They also prey on nymphs, but at lower rates. ■

A method for rearing diapausing rice yellow stem borer (YSB)

Z. Islam and M. Hasan, Entomology Division, Bangladesh Rice Research Institute, Joydebpur. Gazipur, Bangladesh

YSB *Scirpophaga incertulas* (Walker) remains in diapause for 3-4 mo during the winter in Bangladesh. Study of the diapause with the use of rice stem-cuts to house diapausing larvae is difficult: stem-cuts need to be changed frequently, because they rot or dry up; diapausing larvae are disturbed and injured during transfer to new stem-cuts; and observation of larval development and pupation is virtually impossible because the rice stem-cuts are opaque.

To overcome these problems, we developed a simple method for rearing diapausing larvae, using 14-cm-long transparent plastic tubes (inner diameter about 4 mm, outer diameter 4.3 mm) (see figure). Two 1-cm-long cotton plugs are inserted into the tube at one end, with a 1.5 cm gap between them. One larva is introduced at the other end and the tube closed with another cotton plug.

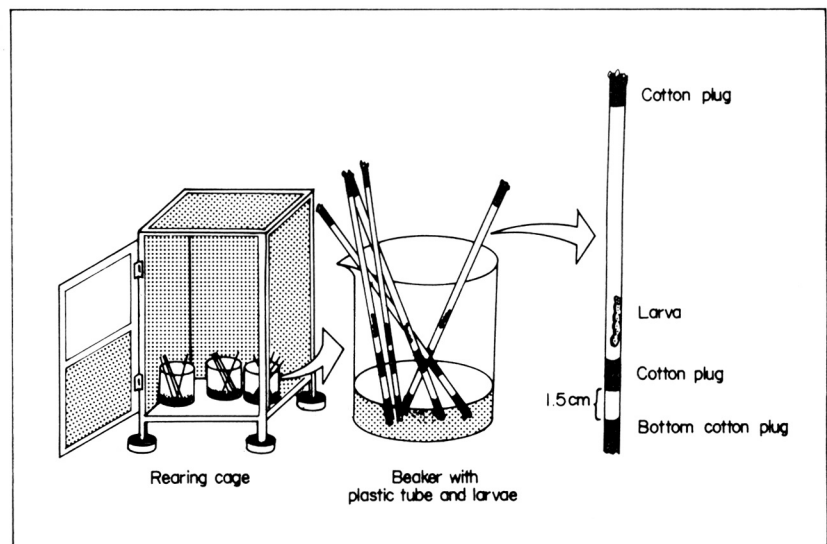
We kept 86 tubes with larvae in three beakers wrapped in brown paper and containing a little water. The tubes stand

so that the ends with double plugs remain in contact with the water. The terminal plug soaked by the water in the beaker provides the required humidity in the tube. At the same time, the second plug remains dry to help keep the larva separated from the wet plug.

The beakers are placed in an insect rearing cage in the laboratory under normal photoperiod and temperature. The water in the beakers is changed at 4- to 5-d intervals and the beakers protected from ants.

Before pupation, the larva cuts a hole through the tube wall, seals it with membrane, forms a puparium, and then pupates. The moth emerges through the hole just as it does in a rice stem.

Among 86 larvae collected in the field and placed in the tubes in November, 20 escaped within 2 d by cutting holes through the tubes. The 20 probably were not in diapause. Of the 66 remaining larvae, 46 moths (70%) emerged (24 male and 22 female) in January and February.



Method for rearing diapausing rice yellow stem borer *Scirpophaga incertulas* (Walker) in plastic tubes. Bangladesh, Nov 1989-Feb 1990.