Predation of brown planthopper (BPH) eggs by *Cyrtorhinus lividipennis* reuter

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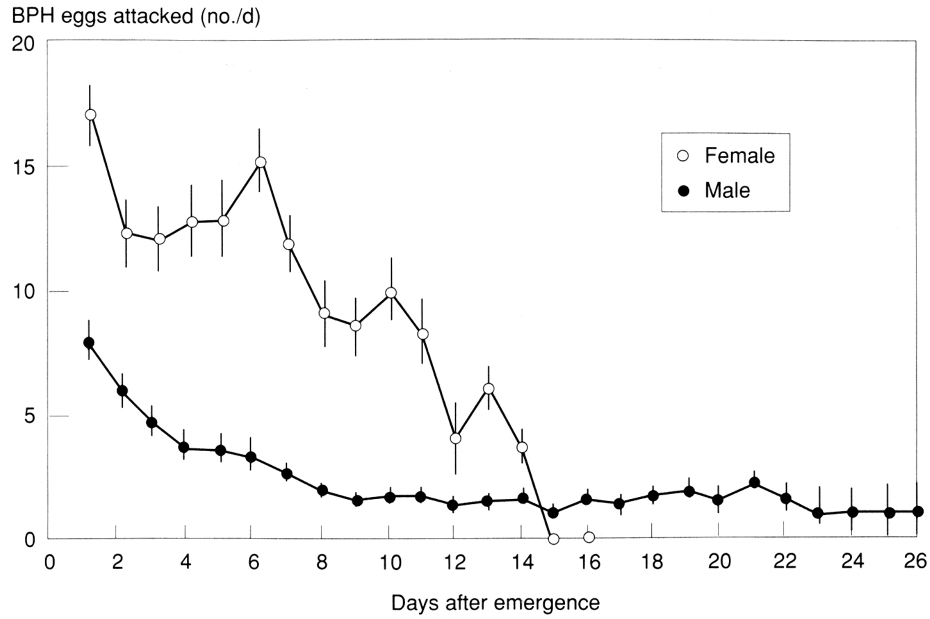
We measured mirid predator consumption of BPH eggs. Females had higher daily and total consumption of BPH eggs than males. But maximum longevity was shorter in females (16 d) than in males (26 d). Egg consumption by both females and males was highest 1 d after the mirid emerged.

Egg consumption by mirid females was relatively high the first week, then decreased (see figure). Total lifetime consumption by females was 143.68 ±17 eggs; that of males was 61.23 ± 12.7 eggs. Average consumption per day was about 8.98 ± 1.06 for females and 2.36 ± 0.49 for males. ■



Predation of BPH eggs by *C. lividipennis* adults. Vertical lines are standard error of the mean. IRRI, 1988.

Survival of overwintering rice stem borer (SB) larvae in conventional and no-tillage wheat

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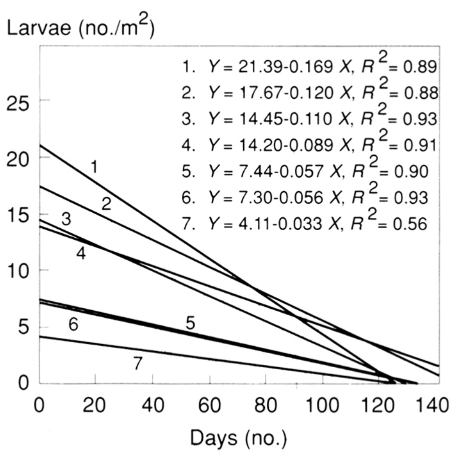
Survival of overwintering SB *Scirpophaga incertulas* Walk. and *S. innotata* Walk. larvae in wheat stubbles (live larvae/m^2, 10 samples/plot) was monitored in no-tillage and conventional tillage wheat at 4 sites Dec-May 1987-88. Larvae density was higher in no-tillage wheat plots in Dec-Jan, but was almost equal in no-tillage and conventional tillage wheat plots at end of the larvae hibernation period (Feb-Mar) (see figure).

Regression analysis indicated a linear trend in larval mortality over time. Regression lines for both tillage systems were identical, indicating no significant difference in survival of larvae between tillage systems. ■



Survival of SB larvae in conventional and no-tillage wheat. 1, 2 = no tillage at Motra sites I and II; 3 = conventional tillage at Muslimanian; 4 = no tillage at Muslimanian; 5, 7 = no tillage at Quinkey sites I and 11; 6 = conventional tillage at Quinkey.

Protein accumulation in developing oocytes of *Nilaparvata lugens*

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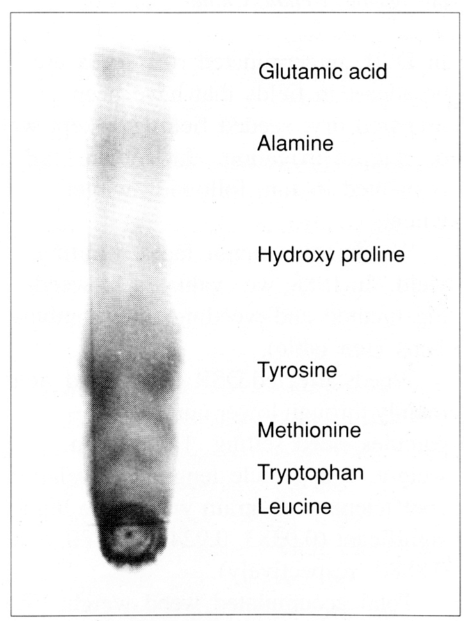
Not much attention has been paid to the reproductive physiology of brown planthopper (BPH) *Nilaparvata lugens.* Protein content and free amino acids at different stages of ovary have been estimated, and the possibility of an antibody against the yolk protein in the ovary has been raised.

Female BPH possess a pair of telotropic ovaries, and the oocytes develop in association with two kinds of supporting cells. An ovariole consists of a single



1. Free aminoacids identified in the mature ovary (butanol:acetic acid:water solvent system).

strand of several oocytes. At the apex of each ovariole is a syncytium of nurse cells (tropharium) that connect provitellogenic oocytes by strands of cytoplasm (trophicards).

We homogenized mature oocytes in ovaries in a microhomogenizer containing 1.0 ml of 80% ethanol. Chromatogram run in butanol, acetic acid, and water (12:3:5) were localized using 0.2% ninhydrin. Protein content was estimated at different stages of ovary development.

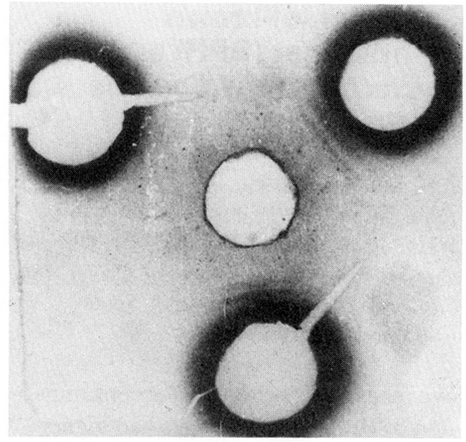
Protein from mature oocytes in the ovary was immunized in a rabbit. One ml sample from the homogenized mixture and an equal volume of complete adjuvant (Sigma) were used for primary injection. Two subsequent booster doses of incomplete adjuvant (Sigma) were given at 10-d intervals. Ouchterlony's immunodiffusion method was followed. Ten microliters of the serum and sample was applied as well. Precipitated proteins were washed in phosphate saline buffer (pH 7, 0.01 M), dried, and stained in coomassie brilliant blue R-250 (methanol, acetic acid, and water 18:7.5:48.5).

Amino acids increased as ovary growth advanced. In immature and premature ovaries, free amino acid content was, respectively, 39% and 72.25% that of the mature ovary. The increase in amino acids at all stages was statistically significant.

Protein content also increased as the ovary matured. The immature ovary had a minimum value of 17.1% protein, and the premature ovary, 44.4%, that of the fully mature ovary. Protein increase at all stages was significant.

Chromatographic study showed seven free amino acids in the mature ovary: glutamic acid, alanine, hydroxy proline, tyrosine, methionine, tryptophan, and leucine (Fig. 1).

The immunodiffusion study showed antivitellin for vitellin of BPH. Two bands were observed after staining in coomassie brilliant blue. Further study is under way to elucidate the role of lytic enzymes in yolk utilization during embryogenesis (Fig. 2). ■



2. Immunodiffusion of ovarian proteins against the antiserum raised in the rabbit.

Integrated pest management — weeds

Preliminary study on weed control in dry seeded rice (DSR) after winter wheat

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In DSR, ungerminated rice seeds are broadcast in fields that have been prepared dry; seeded fields are kept wet by interim irrigation. In Henan, DSR is planted in Jun, following winter wheat.

Weeds are a major factor limiting yield. In 1988, we evaluated 11 weeding method and weeding time combinations (see table).

Weeds affected DSR growth and yield mainly through lower numbers of panicles, seed setting, 1,000-grain weight, and panicle length: correlation coefficients with grain yield were highly significant (0.9383, 0.9243, 0.9180, and 0.8880, respectively).

Total accumulated weed weight (X_1) and grasses weight (X_2) correlated negatively with rice grain yield (Y). Simulated equations were

$$Y\,(\text{t/ha}) = 4.6221 - 0.0068X_1\,(\text{g/m}^2) \quad (r = 0.9271^{**})$$

$$Y\,(\text{t/ha}) = 4.0561 - 0.0072X_2\,(\text{g/m}^2) \quad (r = 0.9762^{**})$$

We suggest total weed weight or grasses weight be used as a criterion for assessing crop losses caused by weeds (the higher the weed weight, the lower the rice yield).

Effect of weeding times and methods on weed growth and yield of DSR Yujing 2.[a] Zhengzhou, Henan, China, 1988.

Treatment[a]	Grain yield (kg/20 m^2)	Panicles (no./m^2)	Seed set (%)	1,000-grain wt (g)	Panicle length (cm)	Weed weight[d] (g/m^2)
Unweeded check	0 d	0	–	–	–	611.53
Weed-free	7.9 a	380.85	94.20	27.53	16.36	
Hoeing 2 WAS + hand weeding 5 WAS	5.6 bc	254.10	92.19	26.41	15.90	343.42
Hoeing 3 WAS + hand weeding 5 WAS	5.2 c	272.40	90.77	26.80	16.20	318.82
Hoeing 3 WAS	1.3 d	137.55	77.79	24.38	15.23	520.55
Hoeing 3 WAS + hand weeding 5 and 7 WAS	7.0 ab	354.15	94.10	27.18	16.44	226.29
Nitrofen + hoeing 3 WAS	6.6 abc	274.95	92.06	26.70	16.32	257.84
Nitrofen + hoeing 3 WAS + hand weeding 5 WAS	6.2 abc	289.20	92.01	27.57	16.55	189.34
Weed-free 10.25 DAS	5.8 bc	272.55	93.04	27.11	16.23	180.19
Weed-free 25-40 DAS	7.6 a	333.30	92.49	27.27	16.27	174.73
Weed-free 40-55 DAS	5.1 c	214.20	91.19	2.5.89	15.90	376.34

[a]Av of 3 replications. [b]WAS = weeks after sowing, DAS = days after sowing. [c]Means followed by a common letter are significantly different at the 5% level by LSD. Total accumulated dry weed weight at each weeding time and harvest individually.