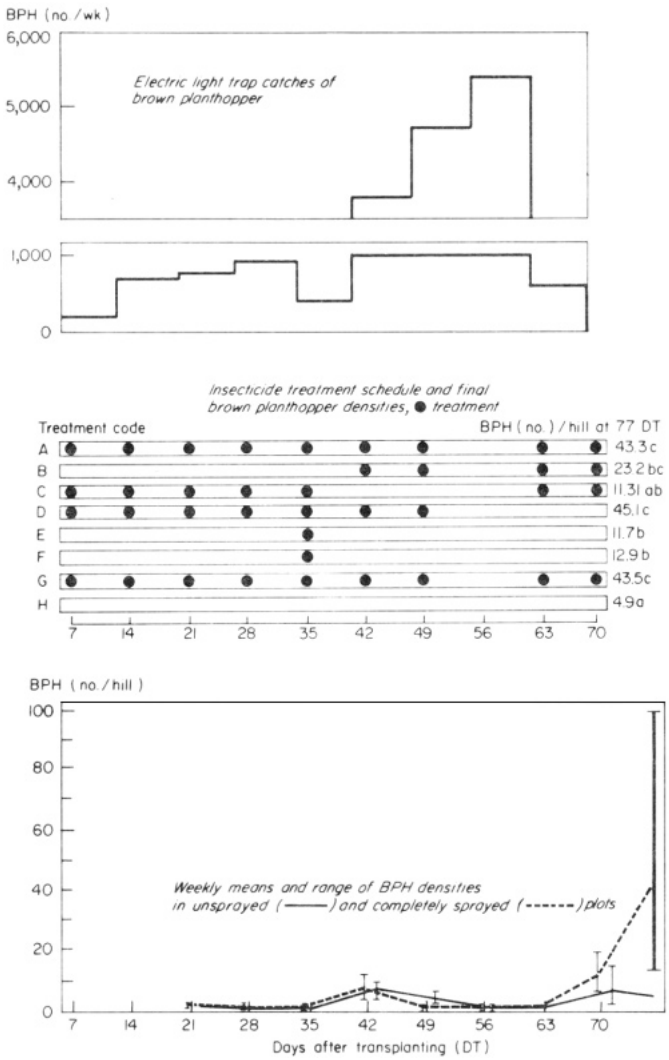

BPH data from Mindanao, Philippines, show BPH resurgence on IR36.

were observed in some nearly mature plots of IR36. IR36 is BPH resistant. The following data were collected from light traps, weekly field counts, and insecticide use records (see figure).

Light trap data showed BPH numbers peaked 7 to 9 weeks after transplanting Final field counts showed that all plots sprayed with the recommended mixture of chlorpyrifos and BPMC during this peak (treatments A, B, D, G) had higher BPH population densities than those not sprayed. Plots sprayed before and during the peak (A, D, G) had higher densities than those sprayed either before or during the peak (B, C, E, F). Mean population density exceeded 95 BPH/hill in one field. Other studies showed that neighboring farm fields contained 15 predators and parasite species known to feed on BPH.

We concluded that destruction of natural enemies allowed BPH to flourish in sprayed plots. Populations in unsprayed plots never exceeded the 20/hill economic action threshold.

This is the first report of BPH resurgence and subsequent hopperburn on certified IR36 after 6 years of widespread planting in the Philippines, indicating the evolution of a host plant resistance-breaking phenotype. The heavier the insecticide use the higher the multiplication of BPH able to feed on IR36. This may contribute to biotype emergence.

Cytological variations among brown planthopper biotypes 1, 2, and 3

R. C. Saxena, associate entomologist, IRRI, and principal research scientist, International Centre of Insect Physiology and Ecology, P. O. Box 30772, Nairobi, Kenya, and A. A. Barrion, research scholar, IRRI

Cytological studies of the meiotic chromosomes of brown planthopper (BPH) biotypes 1 and 2 maintained as stock cultures at IRRI for several years revealed that meioses I and II were reductional and equational for all components of the species' genome. Similar phenomena were observed for biotype 3. Investigations used primary spermatocytes of newly emerged brachypterous males to characterize the nuclei and chromosomes and determine their morphometrics and behavior during the sequential stages of the first meiosis.

Salient variations in nuclear and chromosomal measurements of biotypes 1, 2, and 3 during substages of *prophase I* are shown in the table.

During *metaphase* I chromosomal behavior showed clumping or clustering of highly condensed and shortened autosomes at the equatorial portion of the reproductive cell and separation of the highly heterochromatic synapsed sex chromosomes from the autosomal grouping. The following variations in the three biotypes were noteworthy:

1. Biotype 1 had the highest number of *metaphase I* cells; biotype 2 had the least cells.
2. Biotypes 1 and 3 had two kinds of *metaphase I* cells – cells with sex chromosomes isolated from autosomes and cells with both chromosome types grouped together; biotype 2 had only the first type of cells.
3. The average distance of the sex chromosomes from autosomal grouping was greatest for biotype 2, almost twice that of biotype 1, while biotype 3 ranked next.
4. More cells with combined autosomes and sex chromosomes were observed in biotype 1 than in biotype 3. Intra- and interchiasmatic connections were higher in biotype 1 than in biotype 3 homologues.
5. Sex chromosomes of the three biotypes varied in length and width.

Biotype 2 had the longest chromosomes and biotype 1 had the shortest. Biotype 2 had the widest X and Y chromosomes, while biotype 1 and 3 measurements were almost equal.

During *anaphase I* measurements of the chromosome clumps at the two poles of the cells showed the lengths and widths of chromosome groupings in biotype 2 differed significantly from those of biotype 1 but not from biotype 3.

At *telophase I* the groupings of chromosomes at two opposite poles of the cells were almost equal for all three biotypes.

Chromosomal aberrations, such as loose pairings of paired homologous bivalents as well as fragmentations of chromosomal deletions occurred more frequently among biotype 1 individuals, followed by biotype 3. □

Variations[a] in nuclear and chromosome measurements of brown planthopper biotypes 1, 2, and 3 during prophase. IRRI, 1981-82.

Prophase I substages		Biotype 1	Biotype 2	Biotype 3
Leptonema				
Nuclei: *aml* and *amw*	ns	31.75µ and 26.50µ, highest	29.90µ and 24.00µ, lowest	30.50µ and 24.75µ intermediate
Zygonema				
Autosomes		no difference	no difference	no difference
Sex chromosome				
Pachynema				
Autosomes *rml*	ns	11.11 mm, lowest	12.43 mm, intermediate	13.17 mm, highest
Sex chromosome *rml*		6.50 mm, lowest	9.00 mm, highest	7.00 mm, intermediate
Diplonema				
Autosomes *aml*[b]		5.92µ, lowest	8.08,µ highest	7.08µ, intermediate
Sex chromosome *aml*		7.50µ	5.00µ	5.00µ
Diakinesis				
Chromosomes *aml*[c]		4.35µ, highest	3.77µ, intermediate	3.39µ, lowest

[a]aml = absolute mean length, amw = absolute mean width, rml = relative mean length, ns = not significant at 5% level by analysis of variance and Duncan's multiple range test. [b]Biotype 1 significantly different from biotypes 2 and 3; biotypes 2 and 3 not significantly different from each other at 5% level by analysis of variance and Duncan's multiple range test. [c]Biotype 1 significantly different from biotype 3 but not from biotype 2; biotype 2 not significantly different from biotype 3 at 5% level by analysis of variance and Duncan's multiple range test.

Rice thrips control by foliar insecticides

D. P. Singh, G. S. Dhaliwal, and Juswant Singh, Punjab Agricultural University, Rice Research Station, Kapurthala 144601, Punjab, India

Rice thrips *Baliothrips biformis* (Bagnall) is a minor rice pest in the Punjab. It usually attacks the late transplanted crop. BHC 10% dust applied at 10 kg/ha (2.5 kg ai/ha) is the only recommended control.

Foliar insecticides for thrips control were field-tested at the Regional Research Station at Gurdaspur. Thirty-day-old PR103 seedlings were transplanted in 20-m^2 plots in a randomized block design with 3 replications. They were sprayed with 10 insecticides 15 days after transplanting. BHC was included as a check.

Thrips/5 hills were recorded before treatment and 3 and 7 days after treatment (DAT). Population reduction was calculated as:

$$\text{Percent reduction} = \frac{\text{Insects counted per sample unit after treatment} \times \text{Insects counted in the control before treatment}}{\text{Insects counted per sample unit before treatment} \times \text{Insects counted in the control after treatment}} \times 100$$

Demeton-o-methyl, quinalphos, fenthion, fenitrothion, monocrotophos, endosulfan, and phosphamidon controlled thrips better than BHC dust at 3 DAT (see table). Phosalone and chlorpyrifos were least effective. However, all insecticides reduced thrips population by more than 95%.

Efficacy of foliar insecticides for control of rice thrips, Gurdaspur, Punjab, India, 1982.

Treatment[a]	Population before treatment (no./5 hills)	Percent reduction after 3 days[b]	Percent reduction after 7 days[c]
BHC	110	88 b	99
Chlorpyrifos	63	77 c	99
Demetono-methyl	70	96 a	97
Endosulfan	93	92 ab	98
Fenthion	52	93 ab	99
Fenitrothion	79	93 ab	99
Methyl parathion	59	87 b	97
Monocrotophos	84	92 ab	98
Phosaione	60	80 c	100
Phosphamidon	64	90 ab	99
Quinalphos	57	93 ab	95
Untreated check	68	–	–

[a]BHC was applied at 2.5 kg ai/ha; all other insecticides were used at 0.5 kg ai/ha. [b]Figures followed by the same letter in a column are not significantly different at 5% level. [c]All treatments were significantly different from the untreated check but did not differ from each other.

The International Rice Research Newsletter (IRRN) invites all scientist to contribute concise summaries of significant rice reseach for publication. Contributions should be limited to one or two pages and no more than two short tables, figures, or photographs. Contributions are subject to ending and abridgement to meet space limitations. Authors will be identified by name title, and research organization.