New biotype of brown planthopper in the Mekong Delta of Vietnam

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Brown planthoppers damaged large areas of IR26, IR30, and TN73-2 (IR1561-228-3-3) early in 1977 in Tien Giang, An Giang, and Dong Thap, three provinces with the highest rice production in the Mekong Delta. To determine if they were new biotypes hoppers were field collected and tested in a glasshouse with two sets of varieties carrying genes *Bph 1* and *bph 2.*

Preliminary results showed that the brown planthopper populations damaged varieties carrying the *Bph 1* gene but did not attack varieties with the *bph 2* gene (see table). Subsequent tests were conducted to determine the host preference of nymphs and adults, nymphal survival and development, and longevity and fecundity of adults. IR32, IR36, and IR38 adversely affected the brown planthoppers. The insects showed no preference for those varieties for feeding, shelter, and oviposition. The varieties manifested antibiosis for nymphal development and longevity of adults. Additional studies are necessary on fecundity.

About 2,000 local varieties and hybrid lines in the germ plasm bank of the University of Can Tho are being screened for resistance to biotype 2.

Reaction of varieties to brown planthoppers collected in Tien Giang, Dong Thap, and An Gang provinces in the Mekong Delta of Vietnam.[a] University of Can Tho, Vietnam, Jan.–Mar 1977.

Variety	Grade of damage[b]	Nymphs that reached adult stage[c] (%)	Longevity of female[d] (days) Range	Mean
		Bph 1 gene		
IR34	MS	54 b	–	–
TN73-2	S	64 bc	2–25	8.5 c
IR26	S	88 c	2–10	7.0 c
IR30	MS	74 c	6–25	13.5 d
		bph 2 gene		
IR38	R	12 a	2– 8	4.2 a
IR32	R	22 a	2– 8	4.8 b
IR36	R	26 a	2– 6	3.4 ab
		Susceptible checks		
Mudgo	S	62 bc	2–20	9.6 cd
TN1	S	70 c	10–20	13.3 d

[a] The experiments were conducted in a glasshouse. In a column, any two means followed by a common letter are not significantly different at the 5% level.
[b] The data were recorded when all plants of the susceptible check variety were killed.
[c] Fifty insects were observed for each variety with 5 replications.
[d] Ten pairs of adults were observed for each variety with 10 replications.

GENETIC EVALUATION AND UTILIZATION

Deep water

Deep-water tour of Thailand, Burma, and India

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D. HilleRisLambers and B. R. Jackson, Thai-IRRI Deep Water Rice Project, Thailand

Scientists from the IRRI deep-water rice team visited Thailand, Burma, and India in August 1977. In Thailand many deep-water rice areas that would normally be under 1 m of water were still dry and many farmers had to reseed because of drought. In Burma the rains came late and farmers in the deep-water areas were just beginning to transplant. But in Howrah, West Bengal, India, heavy rains damaged seedbeds and newly transplanted rice.

Gathering samples for an insect survey in a farmer's field in West Bengal, India, are Dr. H. D. Catling of the Bangladesh Deep-Water Rice Pest Management Project (left) and Dr. Derk HilleRisLambers of the Thai-IRRI Deep-Water Rice Project.

The Agricultural Research Institute at Yezin, Burma, has recently completed three ponds for screening deep-water rice. The International Rice Deep Water Observational Nursery (IRDWON) will be planted in these ponds. At Patna, Bihar, India, nine new ponds, constructed in 1977, are being used to test the rice germ plasm.

In Burma, farmers are increasingly

seeking alternatives to floating rice culture. Instead of growing deep-water rice, farmers in some areas are beginning to plant a regular crop of rice immediately after the water has receded.

In Howrah, West Bengal, the group visited the first trial of new deep-water lines in a farmer's field. Lines are also being screened in Bihar. The Ford Foundation supports these adaptive trials to accelerate the development and introduction of modern varieties in the deep-water areas where water levels vary and floods are common.

Observations of insect pests in deep-water rice fields (see photo) indicated the existence of an insect complex similar to that recorded in an in-depth survey in Bangladesh that has been underway since February 1977. The most important pest was the yellow stem borer *Tryporyza incertulas.* From stem borer counts conducted in the areas visited the mean percentage of infested stems in Burma was 5.3% (1 to 11% in 3 fields); in Thailand, 6% (0 to 14% in 6 fields); and in India, 9.3% (0 to 34% in 4 fields).

GENETIC EVALUATION & UTILIZATION

Drought

Seedling drought test of deepwater rice in Thailand

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Sixty-two hybrid lines and traditional deep-water rice varieties were screened for drought tolerance at the seedling stage.

Listed in the table are hybrid lines that were tolerant to deep water and promising as seedlings under drought conditions.

Drought tolerance of deep-water rices at the seedling stage, Klong Luang Rice Experiment Station, Thailand.

Selection	Stress reading[a]	Recovery reading
BKN 7022-6-2	3.0	5.0
HTA 7203-5	3.0	6.0
BKN 6986-1-2	3.0	6.0
BKN 7022-6-4	3.0	6.0
BKN 6986-108-4	3.5	4.5
HTA 72044	3.5	5.0
HTA 7204-5	3.5	5.5
BKN 7022-10-1-2	4.0	5.0
BKN 6986-59-1	4.0	5.0
BKN 6986-59-7	4.0	5.0
BKN 7022-10-16	4.0	5.5
HTA 7204-2	4.0	5.5
BKN 6986-59-11	4.0	5.5
BKN 6986-66-2	4.5	5.0
BKN 6986-136-10	4.5	5.5
BKN 6986-136-16	4.5	5.5
BKN 6986-66-3	4.5	5.5
Leb Mue Nahng 111	4.5	6.1

[a] Scale of 1–9 in Standard Evaluation System for Rice.

Pest management and control

DISEASES

Transmission of rice ragged stunt disease

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The occurrence of rice ragged stunt disease at IRRI led to the study of its transmission by mechanical means (rubbing and pin-prick method), through soil, and through seeds. None showed positive results.

Ragged stunt is transmitted by the brown planthopper *Nilaparvata lugens.* The brown planthoppers that were captured directly from diseased plants in the field and used to irioculate rice seedlings caused some seedlings to develop symptoms of the disease.

The planthopper's ability to transmit the disease to a susceptible line, IR3839-1, was tested by daily serial transmission after acquisition feedings of 2, 3, 4, or more days until the death of the insect. The repeated tests involved 1,625 insects and 28,753 inoculated seedlings (1,906 seedlings died before symptoms developed). About 40% of the brown planthoppers transmitted the disease.

In a single test with a small number of insects, from 14 to 76% of the planthoppers were active transmitters. Both nymphs and adults transmitted the disease. No striking differences were observed in percentage of active transmitters between female and male adults (46 vs. 42%), and between the brachypterous and macropterous forms (42 vs. 48%). After acquisition feedings of 2, 3, or 4 days, a few insects became immediately infective, while others became infective 33 days after feeding. The average latent period was 8.6 days. The insects retained infectivity after molting, indicating that the virus passage is transstadial. The highest rate of infection observed was that of 22 seedlings infected by one insect during its life span. About 33% of the infective insects infected only one seedling during their life span. The average was 4.3 infected seedlings/infective insect. The daily transmission pattern was generally intermittent. The retention period ranged from 3 to 35 days after acquisition feeding, averaging 14.6 days. The disease-transmitting days from the time that the insect became infective until its death varied from 3.2 to l00%, averaging 41.4%. As infective insects became old, they often failed to infect seedlings. The noninfective period immediately before an insect's death ranged from 0 to 30 days, averaging 7.0 days.

The transovarial passage was determined by the infectivity of the progeny of viruliferous insects. The progeny were obtained by rearing viruliferous insects on *Monochoria vaginalis,* which was assumed to be a nonhost of ragged stunt virus. The newly hatched nymphs were used to inoculate rice seedlings at daily intervals for 20 days, except when the insects died earlier. Of the 2,472 seedlings inoculated by 164 progeny of the viruliferous