Trip Report
Survey for rice virus diseases in Western and Central Java, Indonesia
July 19 to 23, 2010

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1. Summary

To assess damages from rice virus diseases recently reported in Indonesia, we visited rice fields in Western and Central Java regions. In Indonesian Center for Rice Research (ICRR) located in Sukamandi, Western Java, high levels of mixed and individual infections of rice plants with rice grassy stunt virus (RGSV) and rice ragged stunt virus (RRSV) transmitted by brown planthoppers (BPH) were observed. Fields of farmers and a seed company adjacent to the ICRR field appeared to be also seriously damaged by BPH and the viruses. In Central Java, extensive areas of rice fields were being seriously damaged by mixed and individual infections with rice tungro spherical and bacilliform viruses (RTSV and RTBV) spread by green leafhoppers (GLH), and RRSV transmitted by BPH. Despite the increasing damages from BPH and rice viruses, it seemed that the local governments were not ready to act on the control of the problems yet.

2. Background and Objective

In March of 2010, our collaborator in Indonesia Dr M. Muhsin (Indonesian Center for Food Crop Research and Development) reported that damages from BPH and BPH-transmitted viruses such as RGSV and RRSV are spreading in Western Java. To assess the levels of rice virus problems in Indonesia, we together with Dr. Muhsin visited rice fields in Western and Central Java regions.

3. Field visit in Western Java (July 20)

3.1. Experimental field of ICRR, Sukamandi, Western Java.

- Many rice plants grown in ICRR were showing symptoms typical of RGSV and RRSV (**Figure 1**), although we were told that the virus levels significantly decreased since April 2010.

Figure 1. Rice plants apparently infected with RGSV and RRSV in the experimental field of ICRR.

- Plants at early tillering stages (**Figure 2 A**) as well as those at mature stages (**Figure 2 B**) were severely damaged by BPH (hopper-burned).

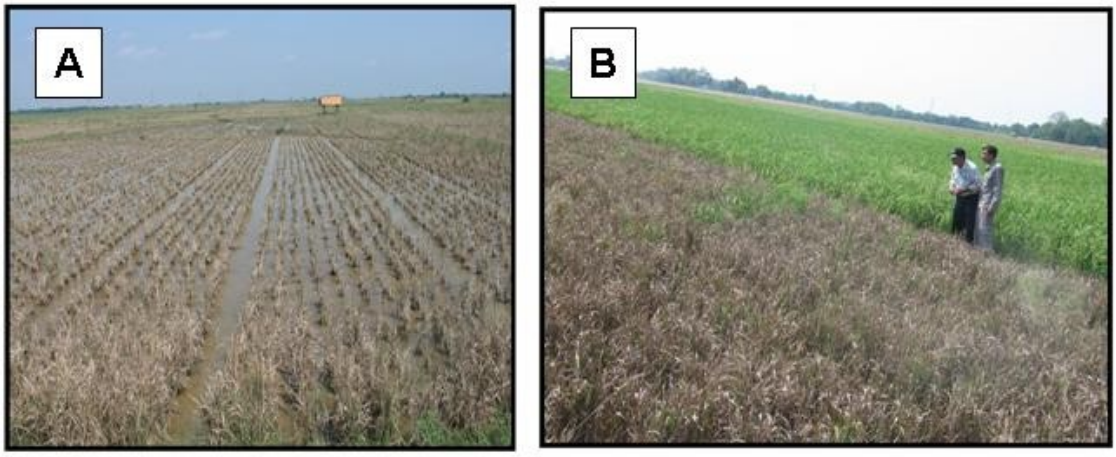

Figure 2. (A) "Hopper burned" fields at early tillering stages and (B) at mature stages in ICRR.

- In many plots workers were still removing rice plants showing the symptoms to prevent virus infections from spreading to other plants. Some plants were covered with nets to avoid further virus infection.
- Workers were also spraying pesticide on rice plants in ICRR, which were already showing symptoms of RGSV and RRSV (**Figure 3 D**).
- According Dr Baehaki (Head entomologist of ICRR), 1) popular varieties such as "Ciherang", which is derived from IR64, are most vulnerable to the recent virus infections, and that 2) they sometimes observed up to 50,000 BPH caught in one night by a light trap in the experimental field.

3.2. Fields of farmers and a rice seed company near ICRR

- Farmers' fields just outside ICRR appeared to be severely damaged by BPH, RGSV, and RRSV (**Figure 3 A, B and C**).
- The field of a government-owned seed company "Seng Hyang Seri" also appeared to be affected by BPH and RRSV, although we were told that the levels of damage decreased since April this year.

Figure 3. (A) and **(B)** Rice plants infected with RGSV and RRSV transmitted by BPH in farmer's field near ICRR. **(C)** Dr Baehaki (Head entomologist of ICRR) and his staff observing rice plants showing symptoms by RGSV and RRSV. The field behind them was severely damaged by BPH. **(D)** A worker spraying pesticide on plants in IRCC, which were already showing symptoms of virus infection.

4. Field visit in Central Java province (July 21 and 22)

- We visited the extension service office of Klaten region, Central Java province. The Klaten region has about 36,000 ha of rice fields, which are mostly irrigated.
- Prior to field visit, we were told by the extension officers that 1) the western part of Klaten region is being affected by tungro disease, and the eastern part with BPH and BPH-transmitted viruses, and 2) some farmers in the region have not been able to harvest rice crops for three consecutive cropping seasons.
- We visited farmers fields in Jogonalan village located in western part of the Klaten regions. Extensive areas of rice fields in the village appeared to be seriously damaged by tungro disease and RRSV (**Figure 4 A, B, and C**).
- A farmer was spraying pesticide on her rice plants which were already showing symptoms of virus infection (**Figure 4 D**).

Figure 4. (A), (B) and **(C)** Rice fields in Klaten region, Central Java damaged by tungro disease and RRSV. **(D)** M. Muhsin, R. Cabunagan and the local extension officer talking to a rice farmer who were spraying pesticide on her plants which were already showing symptoms of tungro disease and RRSV.

- We visited farmers' rice field in Desa Jaten village located in the eastern part of Klaten region. Dr Untung Susanto (ICRR scientist involved in GSR project) accompanied us for the field visit.
- Many fields of the village appeared to be severely affected by BPH and RRSV (**Figure 5 A, B, and C**).
- According to the extension officer accompanying us, a meeting of the task force for BPH management organized by the local government will be held on July 22 near the site we visited in the eastern Klaten region (**Figure 5 D**).

Figure 5. (A) Rice plants affected by RRSV, and **(B)** by BPH in the eastern part of Klaten region, Central Java. **(C)** R. C. Cabunagan explaining the symptoms on a rice plant by RRSV Drs Muhsin and Susanto. **(D**) Venue of the task force meeting for BPH management in Klaten region.

5. Discussion and follow-ups

- According to Dr Zulkifli Zaini (IRRI representative in Indonesia), several possible causes of the increased BPH incidence are: (1) cropping patterns distorted by changes in local climate and rainfall distribution (higher rainfall during dry season; and this condition induced farmers to grow rice continuously, (2) non-synchronous rice planting; not enough time to fallow rice field to cut off the life cycle of BPH (3) use of BPH-susceptible hybrid rice; (4) farmers not alert to BPH symptoms.
- According to Dr Zaini, Director General of Food Crops (Dr Gatot Irianto) sent a letter to all governors in the provinces suffering from BPH damages to control pest and disease in their areas; improve the coordination between institution linkage; immediately operate control posts in regency, sub-district, and village level through local government decree; stabilize crop protection system to be more effective; ban insecticides which facilitate BPH resurgence; implement IPM consistently; plant resistant varieties to BPH; promote development and application of natural enemies of BPH in the field.
- According to Dr Muhsin, the damages from BPH and BPH-transmitted viruses are now possibly spreading to Eastern Java. Indonesia should be included as a target region in any future projects on rice hoppers and virus diseases by IRRI.

- R. C. Cabunagan gave a presentation on BPH-transmitted viruses at ICRR. The staff of ICRR agreed on that the current situation observed in ICRR and the nearby fields is similar to what was observed in Southern Vietnam a few years ago.
- Popular varieties /cultivars in Indonesia are vulnerable to BPH and viruses. We suggested Dr Muhsin that marker-aided selection of resistance to BPH and tungro viruses now can be conducted to introduce the resistance traits into the popular varieties in Indonesia.
- We also encourage Dr Susanto to keep evaluating the plant materials of GSR project in Central Java to select plant lines withstanding the damages by BPH and viruses.
- Plant samples apparently affected by viruses in Western and Central Java were brought back to, and examined in IRRI to confirm the virus species affecting the rice plants there by enzyme-linked immunosorbent assay (ELISA) (**Table 1**). The results confimed that 1) all plants examined were infected with RRSV, 2) many plants collected in West Java were mix-infected with RRSV and RGSV, and 3) many plants from the eastern part of Klaten region were mix-infected with RRSV and tungro viruses (RTSV and RTBV).

Table1. Virus species identified from plants collected in West and Central Java regions, Indonesia, July 2010.

Province	Site	Number of plants examined	Percentage of plants infected with							
			Individual virus				Mixture of			
			RRSV	RGSV	RTSV	RTBV	RRSV RGSV	RRSV RTSV	RRSV RGSV RTSV	RRSV RTSV RTBV
West Java	Seng Hyang Seri seed company	5	100	80	0	0	80	0	0	0
	ICRR	15	100	87	0	0	87	0	0	0
Central Java	East Klaten	14	100	14	86	43	14	86	14	43
	West Klaten	10	100	60	0	0	60	0	0	0