third, cooperation often is needed to give the best results and practical solutions.

We had hoped to reserve more opportunity in our workshop to such applied aspects. Specialists in this field, who were especially invited, regretted it very much that they had to be present elsewhere.

The design of this workshop was and is purposely moderately sized. Nevertl less we are very glad to may welcome two American colleagues. That they are placed at the end of the programma has no other reason than that their topics on different kinds of strategies form a solid and highly interesting closing o the sessions. We had some difficulties in arranging the lectures according to more or less related subjects and we hope that you find the programme not too heterogeneous.

The health of Dr. Ossiannillson did not allow him to be present here. Everybody knows his publication of 1949 entitled Insect Drummers. In a brillia way he has proven the important role of sound communication, also in the small species of leafhoppers and planthoppers. A subject which has given rise to muc sophisticated research; you will hear more about it today and tomorrow. I sugg that we send Dr.Ossiannillson this card with our signatures.(Card and signatur are copied in the present newsletter).Photographs and text are made by Michel Boulard, Paris, who is at this moment exploring the tropical fauna of Cicadida pre-eminently the song-cicadas.

Finally, I am certainly hopeful that this workshop will yield successfull results. The future intercourse in our research fields will become stronger. I wish you further, a pleasant and meaningful stay in this country.

BROWN PLANTHOPPER, NILAPARVATA LUGENS (STÅL) (HOM., DELPHACIDAE), PROBLEMS ON RICE IN INDONESIA.

O.Mochida & T.Suryana (Sukamandi, Subang, Indonesia).

Thirteen determined species are known as the members of the genus Nilaparvata. N.lugens is distributed widely in South and Southeast Asia, some Pacific Islands, and Australia. Rice plants damaged by Sogatella furcifera (Horvath) (Delphacidae) and N.lugens were recorded for the first time in Japar in A.D.697. In South and Southeast Asian countries, however, N.lugens was not

regarded as one of the important insect pests on rice about ten years ago (Mochida et al., 1977).

Outbreaks in Indonesia. Kalshoven (1950) reported the hopperburn of paddy fields caused by N.lugens in small areas in West Java 1931, in East Java 1939, and in Yogyakarta 1940. But there is no record of the outbreaks of N.lugens over large areas in Indonesia before 1969. The acreage of rice fields attacked by N.lugens has been increasing year by year and reached about 352,000 ha in the wet season 1976/77. The total area of the rice fields attacked was estimated at about 7.8% of the total area harvested for paddy rice crop in 1977.

Causes of outbreaks. Continuous rice cropping in irrigated areas throughout the year, high-yielding susceptible cultivars introduced from other countries or bred in Indonesia, and high amounts of nitrogen fertilizer(s), are probably related to the outbreaks of the pest.

Bionomics and natural enemies. Generations repeat approximately once a month in lowland areas. One nematod, 14 insects, and 8 pathogens are known as the natural enemies in the world. In Indonesia Harmonia octomaculata Fabricius (Col., Coccinellidae), Micraspis lineata Thunberg (Ibid.), Digonatopus javanus (Perkins) (Hym., Dryinidae), and Hirsutella sp. (Stilabaceae) are confirmed as the natural enemies. Though Cyrtorhinus lividipennis is found in rice fields in Indonesia, we did not check whether it is a natural enemy, or not.

Resistant cultivars and a new biotype. Four resistant genes of rice plants to N.lugens are known; BPH 1, bph 2, BPH 3 and bph 4.

High-yielding resistant cultivars are known in Indonesia; IR26, 28, 29, 30, 34, Asaham, Brantas, Citarum, and Serayu with the BPH 1 gene; IR32, 36, 38, 40, and 42 with the bph 2 gene. No high-yielding cultivar with the BPH 3 or bph 4 has been bred yet. When IR 26 was introduced from the Philippines into North Sumatra in 1974, it was resistant to N.lugens. But IR26 has been attacked severely in North Sumatra since December 1976. This seems to indicate the appearance of new populations of N.lugens showing different reactions to the cultivars with resistant gene(s). The new populations are named "biotype 2". The biotype 2 was/is found in four provinces of Aceh, North Sumatra, East Java, and Bali. IR32, 36 and 38 are not known to be attacked in Indonesia.

Two diseases of the rice plant transmitted by N.lugens. "Grassy stunt" and "kerdil hampa (empty panicle)" are transmitted by N.lugens. IR28, 29, 30 and 34 were confirmed to be resistant to grassy stunt. But no resistant gene or cultivar has been found to kerdil hampa yet.

Control. Resistant cultivars, cultural methods (a, simultaneous rice cropping;

b, fallow or cultivation of crops other than rice, especially in the dry season), and timely application of some suitable insecticides should be combined for controlling the insect pest. When the population density of N. lugens is high, it is almost impossible to prevent the high infestations of rice plants caused by each of the two diseases by applying insecticides to the vector insect in the field.

BIOTAXONOMY OF N. LUGENS (STÅL) IN SOUTH-EAST ASIA.

M.F.Claridge & J. den Hollander (Cardiff, U.K.).

N.lugens is widely distributed, from India to the Solomon Islands and fro Japan to Queensland. It is generally regarded as the single most important insect pest of rice in the area. Not only does it damage the plants directly causing hopperburn, but it is also a vector of grassy and ragged stunt disease

The Centre for Overseas Pest Research (COPR), London, has recently develo a collaborative research programme with the International Rice Research Instit (IRRI), Philippines, and the South East Asian Regional Centre for Graduate Stu in Agriculture (SEARCA). The main areas of collaboration include biotaxonomic and genetic studies, population ecology and migration, and techniques of contr The U.K. input on biotaxonomy and genetics has been contracted to the Zoology Department, University College, Cardiff, under the direction of M.F.C.

N.lugens has developed a number of so-called biotypes in different parts its range which are characterised by their abilities to attack and destroy different previously resistant varieties of rice. This problem was first identiefied in the Philippines, but has now been detected in most major rice growing countries.

The nature of these biotypes has been investigated both at IRRI and by us Contrary to early reports, the biotypes - at least in the Philippines - freely interbreed, producing fertile offspring.

Our major effort is devoted to the characterisation of populations from areas with different degrees of spatial isolation. Detailed studies are being made in the Philippines. Morphological work is being done mainly by Dr.J.Kathirithamby, using measurements from field samples and multivariate statistical techniques for analysis. Preliminary results suggest significant differences between populations from Sri Lanka and Malaysia. Biochemical