REPORT ON A MEETING OF A PLANNING GROUP FOR INTEGRATED CONTROL OF RICE PESTS IN SOUTHEAST ASIA
May 9-12, 1972, Los Banos, Philippines

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Environmental Protection Project

July 27, 1972

Summary

1. Discussions at this planning meeting emphasized the critical need to develop a broad ecological approach to pest control in rice in Southeast Asia if the gains already achieved and those anticipated in the Green Revolution are to be protected.
2. The group of researchers in agronomy, plant protection and plant breeding together with administrators present were enthusiastically in support of the development of a multi-country cooperative project for integrated control of rice pests.
3. Committees were appointed for the development of detailed project proposals with a follow-up meeting to be organized by the UC/AID Pest Management Project probably in November, 1972.
4. Major obstacles to the full development of this broad approach to crop protection include a) overdependence on plant resistance and chemical control, b) influence of pesticide industry on a "brain drain" and in substituting for extension, c) limited effectiveness of extension programs of stress on highest possible yields per unit area regardless of consequences to agroecosystem.

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Ray F. Smith, University of California, Berkeley, J. Lawrence Apple, North Carolina State University, and L. Dale Newsom, Louisiana State University, represented the UC/AID Pest Management and Related Environmental Protection Project at the meeting of the Planning Group for Integrated Control of Rice Pests in Southeast Asia, May 9-12, 1972. The morning of May 8 was spent in informal discussions with S. H. Ou, M. D. Pathak, V. A. Dyck, and H. E. Kauffman of IRRI, R. Chiu and S. C. Chiu Wan of the Republic of China, and Ting Wen-Poh of Malaysia on background information concerning the meeting, future plans and procedural approaches for follow-up meetings, conduct of the working sessions, preparation of a report on the meeting, and possible sources of funding of projects that might be expected to emerge.

During the afternoon of May 8, Smith and Newsom with Kauffman of IRRI toured the field plots devoted to production of crops other than rice. Grain sorghum, corn, soybean, mung bean, cowpea, sweet potato, cabbage, and pepper were being produced as components of the multiple cropping system being stressed at IRRI. These crops were in various stages of growth and development and were being attacked by a variety of insect pests. Grain sorghum was infested by Heliothis armigera and Ostrinia fornicalis and showed evidence of having been heavily attacked 3-4 weeks earlier by aphids; it was moderately infested by an unidentified leafhopper; an unidentified species of webworm was causing a substantial

amount of damage to varieties which were heading. Corn was being heavily attacked by Ostrinia fornicalis and a spider mite, probably Tetranychus neocaledonicus. Noticeable phytoxicity on leaves in the whorl area was apparent as a result of excessively heavy application of 10 percent diazinon granules for control of the stem borer. All of the leguminous crops were being attacked by Prodenia litura. In discussion with IRRI staff about plant protection as a component of the multiple cropping system, it was brought out that very heavy rates of insecticides were being routinely applied on fixed schedules with little regard for pest identification, population levels or economic injury thresholds. This was also confirmed by the agronomist, Robert Harwood, who had recently joined the IRRI staff to take charge of the research on multiple cropping.

Apparently, the major objective of the multiple cropping research program has been, and continues to be, establishment of yield potentials under the most favorable environmental conditions, including maximum protection from pests, that can be provided for the various crops. This philosophy has resulted in a lack of attention to the plant protection component of multiple cropping. Not enough attention has been paid to the pests to get all of those doing substantial damage to one or more crops identified. Heavy rates of highly toxic materials are being used at excessive rates and numbers of applications without regard to cost or economic injury levels.

The formal portion of the workshop program opened May 9 with a short welcoming address by R. F. Chandler, Jr., Director of IRRI. He expressed excitement at the prospect of resistance to all major insects

and diseases being incorporated into commercial varieties of rice in the near future. His attitude toward integrated control was described very well when he stressed his conviction that "Integrated control will be especially useful for the small grower who cannot buy chemicals, etc." Obviously, there is much need for a strong effort being made to educate the administrators of research programs of the importance of channelling plant protection research toward the concept of integrated control. If they cannot be led to take this step as a result of the experiences of others on different crops in other parts of the world, they will be driven to it by increasing disasters of the sort experienced by rice producers of the Central Plain of Luzon during 1971.

Following Chandler's welcoming remarks, there was a paper reading session devoted to presentations on rice disease, weed, and insect problems: current research and future needs in Indonesia, Korea, Malaysia, Philippines, Republic of China, Thailand, and Vietnam (no representative from Vietnam, paper sent and read by Pathak). The paper reading session ended in time for the workshop participants to be conducted on a tour of the IRRI rice research plots. Wednesday was devoted to sessions on current studies and outlook of rice insect control in Japan, rice disease, insect and weed studies at IRRI during the morning and to integrated pest control development and practices in other parts of the world during the afternoon.

The reports varied in detail from nation to nation. However, all reports were characterized by similar themes pointing to the urgency of the immediate development of vigorous, adequately supported, well-coordinated, highly cooperative regional research projects on integrated

control of rice pests. All of the reports stressed the rapid changes occurring in species composition and importance of pests with changes in varieties, increased fertilization, and other production practices characteristic of the "Green Revolution." The serious shortage of enough properly trained personnel to perform the research so critically needed was also stressed repeatedly.

Problems of the sort reported by Lamey with the introduction of the variety IR 667 into South Korea were recited by almost everyone. IR 667 was reported to be very susceptible to the rice stem borer, brown planthopper and grass roller, the latter a pest unknown prior to 1971. The variety proved to be so highly susceptible to Nilaparvata that it was used as the susceptible check in breeding experiments for resistance to this species. Growing of barley was reported to be increasing thus providing an alternate host for several species of leafhoppers and planthoppers so that much larger numbers, than previously was the case, have been available to attack the rice crop. Barley was also found to be an alternate host of rice stripe virus. Pesticide use which had averaged 2 applications per year until 1968 increased to 3 in 1969 and 4 applications per year in 1970.

Tour of the IRRI research plots provided further evidence of the inadequacy of pest control based on reliance upon use of chemical insecticides as the only component of a pest management system. The system used at IRRI has resulted in the change in status of brown planthopper from a sporadically occurring minor pest easily controlled by applications of the O-P insecticides to that of the major pest at IRRI, almost impossible to control with such highly effective, broad spectrum pesticides

as diazinon and methyl parathion. Some varieties almost ready for release showed high levels of resistance to the pest. Abundant evidence from reports of the researchers from various countries plus results that could be observed in the plots at IRRI pointed to an inevitably deteriorating situation in Southeast Asia unless research quickly and effectively can be directed into the integrated control approach.

The afternoon session of May 10 was devoted to the presentation and discussion of papers on development of integrated control in California and in Southern United States and to pest management programs in North Carolina and the organization of regional research. These papers were prepared by the UC/AID project personnel to set the stage for discussions of national and regional research proposals on integrated control of rice pests during the remaining day and one-half of the workshop sessions.

The afternoon session concluded with a presentation by Swilke on the cooperative rodent control program between AID and the Philippines. Three objectives of the program were stressed: 1) Research and development of new methods of control. 2) Teaching to develop competence in the Country required to maintain the program when AID support is discontinued. 3) Help farmers develop a method of rat control that they can employ economically and effectively.

The morning session of May 11 began with an announcement and short discussion by D. B. Reddy of the meeting of the 12th Session of the International Rice Commission in Bangkok to be held during October and November 1972. He listed as agenda items for the Plant Protection

Sessions: 1) Integrated control of rice insects. 2) Screening and testing varieties for resistance to major diseases. 3) New chemicals for control of weed pests of rice.

Smith initiated discussions of proposals for integrated control at national and regional levels by summarizing the basic procedures involved in developing an integrated control program. He stressed the following steps as being essential: 1) Define the best integrated control possible based on available knowledge. 2) Test this program under grower conditions. 3) Initiate a supporting research program designed to develop new methods and techniques that can be progressively integrated into the system. This discussion was followed by a series of papers dealing with the contribution and importance to the integrated control concept of crop loss estimates, epidemiology of diseases, ecology of insect pests, chemical control, breeding for resistance, biological control, and microbial control of insects.

In these papers and the discussions that accompanied them the lack of information appeared to be emphasized rather than the availability of enough information for the initiation of integrated control programs. Lack of data in the following areas was stressed: 1) economic injury thresholds for individual pest species and the total complex; 2) population dynamics as a basis for prediction of trends in pest populations; 3) effective surveillance methods; 4) epidemiology of diseases with emphasis on off season survival of pathogens and factors responsible for build-up to outbreak proportions; 5) type of chemical required for effectiveness under tropical and sub-tropical conditions; 6) improved methods of testing efficacy of pesticides in small-plot

screening trials which include untreated plots and highly susceptible varieties that may impose much heavier pressure with consequent skewed results, than if untreated plots were eliminated and the most tolerant varieties were included; 7) techniques of breeding for resistance in a crop attacked in most localities by at least 5 major diseases and 4 major insect pests; 8) the possibility of biotypes developing that can overcome resistance in a variety; 9) varietal response over broad geographical areas; 10) possibility of putting together in one variety acceptable levels of resistance to all pests; 11) information on the control potential of biotic agents.

After lengthy discussions and questioning on the integrated control approach and its status in Southeast Asia, a number of problem areas were identified as appropriate for regional project development. These included tungro virus, blast, bacterial leaf blight, sheath blight, and other viruses in the field of plant pathology and stem borer, gall midge, green leafhopper and planthoppers in entomology.

With the opening of the concluding session of the workshop on the morning of May 12 it quickly became apparent that the participants were quite enthusiastic about the development of a regional project based on the integrated control approach. The pathologists agreed upon tungro virus, bacterial leaf blight, blast and sheath blight as problems for which regional and national research proposals would be developed with S. H. Ou taking the overall responsibility to coordinate the development of these proposals.

The entomologists proposed to take their best package of current recommendations to the growers for control of rice pests and as the

basic components from which to develop and test an integrated control program. They chose to concentrate on the rice stem borers, leafhopper-planthopper complex with major emphasis on the stem borer. The following elements were agreed upon for a beginning integrated control program to be tested in several localities under grower conditions.

1. Planting the stem borer, tungro virus resistant variety IR-20.
2. Insecticide treatments (a) to seedbed with diazinon or BHC (b) seedling dip at transplanting time with the systemic insecticide carbofuran (c) one application at booting stage (about 80 days after transplanting) of diazinon or BHC (d) all other insecticide applications to be made on the basis of continuing population assessment and economic injury thresholds.
3. Keeping of complete records on populations of other pests, with emphasis on leafhoppers and planthoppers, and predators and parasites.

In addition to this program the entomologists agreed to develop cooperative national and regional projects on stem borers and leafhoppers-planthoppers.

The remainder of the session was spent in discussions of mechanisms for preparing and distributing a report of the meeting, appointment of a drafting committee composed of IRRI personnel, possible sources of funding research proposals, and a follow-up meeting. It was proposed that the UC/AID project would be responsible for organizing the next meeting (with strong sentiment for holding it in Bangkok immediately before or after the International Rice Commission Meeting during October

and November 1972). The formal session concluded with a short address by D. S. Athwal, Assistant Director IRRI.

Smith and Newsom met at a luncheon May 12 with faculty of the Department of Entomology, University of the Philippines. They also met for about an hour and fifteen minutes with Mr. Allen Hankins, USAID/Manila. This conference proved to be mutually informative and quite valuable to us in helping better to understand some of the relationships between University of the Philippines, Bureau of Plant Industry of the Ministry of Agriculture, IRRI, and USAID.

CONCLUSIONS

A small but significant beginning toward development of integrated control of rice pests in Southeast Asia has been made as a result of this planning meeting. However, it is not likely to survive, much less grow properly, without a vigorous follow-up of encouragement and support. Major obstacles to the healthy growth and development of this philosophy of pest management in Southeast Asia are the following:

1. The concept of basing everything on the plant breeder leaving the entomologists and plant pathologist to struggle with the problems resulting from limited attention to plant protection in the breeding program.

2. Lack of awareness on the part of the scientists in the area, but more importantly the major administrators, of the disasters in plant protection that have occurred wherever reliance has been placed on excessive use of chemicals.

3. Influence of the pesticide industry.

4. Lack of effective extension services.

5. The pressing demands for higher yields at all costs.

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