THE CURRENT STATUS OF RICE PEST MANAGEMENT IN THE PHILIPPINES [1/]

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Introduction

In the past decade, those of us who live in the Philippines and other countries of Southeast Asia have witnessed great strides in the development of high-yielding varieties of crops and the associated agricultural technology. We have also witnessed serious outbreaks of various pests (some old, some "new", including insects, plant pathogens and rodents) which have devastated vast areas of ricelands. Although at times these outbreaks dissipate on their own accord and occassionally, we have had localized successes in reducing the intensity of our losses, these outbreaks have left us painfully aware that the pool of knowledge and technology is woefully inadequate to cope in a meaningful manner with our increasing pest problems. In short, while we have made quantum leaps in the development of modern productive technology, we have not seen the corresponding development in pest management which is essential to assure the full potential of the modern productive agrotechnology.

In the Philippines, recent outbreaks of the brown planthopper, tungro virus and rodents have in part focused the attention of national

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government officials on the need to establish an institutional capability which would deal on a continuing basis with the country's varied and changing pest control needs. It is now realized by our governmental leaders that without an adequate and forward-looking pest management program, the major investments in superior seeds, irrigation infrastructure, agricultural machinery and fertilizer will be for nil.

In the next few minutes, I would like to summarize briefly the nature and extent of major pest problems in producing rice in the Philippines, to describe our current status of crop protection and our future plans. I present this for your information, for your consideration, for your comments and suggestions, and in the hope that the approaches presented may have application for some of your own work.

Ricefield Pest Problems, Nature and Extent in the Philippines: An Overview

The full 365 days a year of sunshine and rain in tropical countries such as the Philippines is both a boon and a bane. While the uninterrupted warmth that basks most of our country allow us to grow crops practically throughout the year, it also permits unabated pest multiplication. This should make us realize that many pest management systems which were developed for temperate countries are not directly suitable for use in the hot, humid tropics. Those of you from temperate countries are quite fortunate to have the freezing rains and cold which each year sets the biological system back to zero, at least from the standpoint of crop protection. This synchronization of pest development makes it much easier to understand and deal with some pest problems.

Major Ricefield Pests

To give you some insight into the kinds and extent of pest problems that we have in the Philippines, which is probably representative of the situation in other Southeast Asian countries, and many parts of the tropical world, allow me to name the major pest complex of rice in my country. I shall categorize these pests into insects, weeds, plant pathogens and vertebrates.

Insects. The three most important are the brown planthopper, (Nilaparvata lugens), the green leafhoppers (Nephotettix spp., largely due to transmission of rice tungro virus), and the stemborers (Tryporyza incertulas and Chilo suppressalis). Two additional important pests are the whorl maggot (Hydrellia philipina) and the rice bug (Leptocorisa spp.)

Weeds. The two most important weed species are the barnyard grass (Echinocloa crusgalli) and the pickerel weed (Monochoria vaginalis). Two others considered potential serious weed species are the bulrush (Scirpus maritimus) and the knot grass (Paspalum distichium).

Plant Pathogens. The most serious disease problems of rice are the vector-borne tungro and grassy stunt viruses. Rice blast, caused by the fungus Piricularia oryzae, although not yet a serious problem in the Philippines, has caused serious damage to rice crops in Taiwan.

Vertebrates. Rodents are the most serious vertebrate pest in the Philippines, elsewhere in Southeast Asia and in many countries of the tropics. Four species are involved in the Philippines: Rattus rattus

mindanensis, Rattus argentiventer, Rattus exulans and Rattus norvegicus.

It is important to note, that while this summarizes the major pest complex in the ricefield agrocommunity, the relative importance of these pests varies from region to region and according to such factors as habitat, weather and season. In fact, with the advent of non-photoperiod sensitive species, which can be planted anytime of the year, and with the development of new agricultural practices in the Philippines, a number of "new" agricultural pests have emerged. Some of these, such as the brown planthopper and the whorl maggot, are already included on this list as major pests and it can be anticipated that even more dramatic changes will occur in the future. Even within species, genotypic frequencies shift according to pest management practices, as we have recently observed in the Philippines with the development of two, perhaps three "biotypes" of the brown planthopper to which many of the more recent lines of high-yielding rice varieties are at least moderately susceptible.

Extent of Losses

Reliable damage assessment methods are not currently available for many Philippine pests or have not been incorporated into national survey programs, so that accurate estimates of total national losses are not available. Current estimates of total losses by individuals and agencies who have studied the problem for Southeast Asia range from 25% to 55%. If an average of 35% is close to accurate, the yearly

projected figure in terms of the combined food and commercial crop production of the Philippines is a staggering 7.3 billion pesos (roughly U.S. $1.0 billion) -- about a fourth of the current national budget. However, such estimates and extrapolations should be viewed critically until more accurate accounts, based on national surveys using reliable assessment methods, are conducted.

Current Status of Pest Management Technology in the Philippines

I have summarized the major pest complex with which we are confronted in the rice paddy. Current pest management practices very widely in the field with some farmers relying heavily on the new resistant varieties, pesticides, mechanical control, luck and prayer and others relying mostly on luck and prayer. In fact, for the control of insects and vectors of rice pathogens, our current recommendations are based primarily on the use of resistant varieties and selected insecticides. For weed control, most Philippine farmers rely on handweeding or the use of a rotary weeder. Both are time-consuming and laborious, but the ready availability of human labor in the villages encourages this tendency. Besides, the labor of the farmer or his children is viewed as "free" because it does not require a cash outlay. Despite this, there is now a growing trend toward the use of herbicides such as the relatively inexpensive 2,4-D which are quite effective against the annual weeds of transplanted rice. The granulation of 2,4-D has given the chemical enough selectivity to be used safely in rice culture.

For vertebrates, current control recommendations called the sustained baiting method is based on the use of chronic anticoagulant rodenticides in baits applied early during the growing period and continued until harvest. The recommendation has benefited from many years of research at the Rodent Research Center involving behavioral studies, studies on bait formulation and acceptance, work on bait station design and placement, and numerous evaluations at the small farm and village levels. Despite its incorporation into national control programs, many farmers still rely most heavily on acute toxicants or mechanical control in the field, and are concerned primarily with killing rats rather than reducing damage to their crops.

Current Status of the Transfer of Pest Management Technology to the Farmer in the Philippines.

Unlike the United States and many other temperate countries where large areas of farmland are owned or operated by a few individuals, in the Philippines, the average farm size of ricefields is less than two hectares and there are over three million hectares of rice farms. Obviously, the problems of transfer of new technology is compounded by this farmer/farm size ratio, and is further complicated by the number of islands and communication problems across the country. Consequently, crop production and pest management has become a problem of the national government which relies on a core of trained extension officers to diffuse the latest technology through a number of programs.

Pest management in rice has been incorporated into the government's intensified rice production program launched in 1973 and called the "Masagana-99" Program aimed at achieving self-sufficiency in the country's staple food. Masagana-99 is an expression of the hope of attaining a national average yield per hectare of 99 cavans (4.4 metric tons), a considerable increase over the average of 63 cavans (2.8 metric tons) per hectare prior to the program.

The key elements on this revolutionary program are 1) credit system requiring no collateral which allows farmers to get ₱1200 (U.S. $162) loan per hectare to finance labor costs and inputs like pesticides and fertilizer; 2) effective transfer of technology through deployment of more than 3,000 field technicians to teach farmers, through dissemination of information through mass media and through careful coordination with cooperating agencies at all levels, and 3) through guaranteed price support.

The National Food and Agricultural Council, a Philippine governmental agency, is charged with the primary responsibility of overseeing the Masagana-99 program with the assistance of other agencies. There are three committees involved in the Program including a management committee, a pesticide technical committee, and a fertilizer technical committee. The committees develop recommendations for production and crop protection practices which are passed on to the farmers through extension officers and the mass media. Of primary interest to this group would be the insect control recommendations as developed by the pesticides technical

committee. These recommendations are based primarily on the use of pest resistant high-yielding varieties and the judicious use of insecticides. In total, the following factors are given detailed consideration incorporating as much scientific information as is currently available in the development of recommendations: varietal resistance, economic thresholds, judicious use of insecticides, minimal hazard to farmers, minimal environmental disruption, and cost effectiveness of control.

Admittedly the knowledge and technology from which the recommendations are based are far from ideal. But it is quite surprising that when the bits and pieces were put together, a workable interim insect pest management program was developed. Despite big gaps in knowledge and technology, we used pest management principles in designing control recommendations in our Masagana-99 Program and I shall hazard to say that the recommendations contributed in no small way to the success of the program in making the Philippines self-sufficient in rice after only three years of implementation.

Future of Pest Management in the Philippines.

In part because of the success of the Masagana-99 experiment, in part because of the recent outbreaks of a number of serious pest problems in our country, and in part because of recognition that current pest management recommendations are at best interim and based on incomplete information, and in recognition of the important role pest management could play in the advancement of Philippine agriculture, the government

has chosen to establish a National Crop Protection Center and seven Regional Crop Protection Centers to more fully serve the country's needs. The National Crop Protection Center was established at the College of Agriculture, University of the Philippines at Los Baños by Presidential Decree No. 936 on May 19, 1976. Specifically the Center is charged with the following functions:

1. To undertake problem analysis, developmental research and planning required to develop crop protection systems against pests of major economic crops.

2. To develop and implement manpower training programs designed to upgrade the pool of manpower required to meet the complex pest control needs of the country.

3. To undertake information exchange and extension to provide farmers and the public with coordinated information about the varied facets of pest control and to emphasize the urgent need for safe and effective pest control practices.

4. To establish adequate linkage between research and operational phases at the farm level in order to insure that the changing research needs of operational activities are met and that the operational activities are based on the most recent and applicable research findings.

5. To provide scientific advice to government planners for the formulation of policies and regulatory programs necessary for dealing with the complex pest control technologies essential for the protection of crops.

While it is too soon to relate in detail the approaches that will be taken by these Centers, the following priorities will be emphasized during the early years of their operations:

1. The scientific and training staff of the Centers will concentrate immediately on developing or updating integrated pest management recommendations in areas where adequate technology already exists with emphasis on rice and corn crops.

2. The training staff of the Centers will begin training extension officers and farm leaders in the latest technology as soon as acceptable training materials and programs are available.

3. The scientists at the Centers will immediately begin establishing field surveillance and monitoring programs to enhance early warning of major pest problems.

4. The scientists at the Centers will begin research in pest management areas where we have defined a critical need.

5. The scientific staff will begin establishing research and training priorities toward the long-term solution of pest problems in the Philippines.