NATIONAL SEMINAR

on

Pesticide Poisoning - Present Knowledge and Urgency for Future Research

Wednesday 4th August 1999
PGRC Auditorium, Gannoruwa, Peradeniya

VOLUME OF ABSTRACTS

Seminar Organized by

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Sri Lanka Association for the Advancement of Science (SLAAS)- Section D

Department of Agriculture

Sponsored by

Sri Lanka Crop Protection Association (SLCPA)

SEMINAR PROGRAM

Inaugural Session

09.30	Lighting of the Traditional Oil Lamp
09.35	Welcome Address - Prof. Kapila Dahanayake - Chairman/NSF and President, SLAAS Section D
09.40	Speech by Chief Guest Prof. H.P.M. Gunasena - Director, Postgraduate Institute of Agriculture (PGIA)
09.50	Keynote Speech Prof. Diyanath Samarasinghe, Chairman, National Dangerous Drugs Control Board
10.10	TEA

Technical Session I (Chairman- Dr Ranil Abeysinghe)

10.30	Pesticide residues and food poisoning- current trends- Ms Y. Mahesan, Government Analyst, Government Analyst's Dept., Colombo 7
11.00	Botanical and other natural chemical alternatives to pesticides- Prof. V. Kumar, Senior Professor and Head, Dept. of Chemistry, University of Peradeniya
11.30	Integrated Pest Management(IPM) as an alternative to pesticides -Department of Agriculture (DOA) Experience Dr M.H.J.P. Fernando, Former Director General, Department of Agriculture
12.00	Suicide, Pesticides and Prospects for Suicide Prevention in Sri Lanka.- Prof. Kalinga Tudor Silva, Professor of Sociology, University of Peradeniya
12.30	LUNCH

Technical Session II (Chairman-Dr M.H.J.P.Fernando)

13.300	Pesticide poisoning- global perspective Mr Wyn Ellis, Secretary General, Asia Pacific Crop Protection Association (APCPA), Bangkok, Thailand
14.00	The role of pesticide industry in pesticide poisoning management Mr. U.E.R.Gangoda, Chairman, Safe Use Committee, Sri Lanka Crop Protection Association (SLCPA)
14.30	Pesticides and their relevance to the tea industry of Sri Lanka Ms Sushila I.Vitarana, Entomologist, Tea Research Institute, Ratnapura
15.00	TEA
15.15	Adverse Human Health Effects of Pesticides in Sri Lanka. Prof. Nimal Senanayake, Senior Professor of Medicine and Dean, Faculty of Medicine, University of Peradeniya
15.45	Closing Remarks Dr. G.K.Manuweera, Registrar of Pesticides, Department of Agriculture
16.00	Vote of Thanks- Dr Sandun Senarath, Secretary, SLAAS- Section D

PESTICIDE RESIDUES AND FOOD POISONING – CURRENT TRENDS

Y.Mahesan

The control of food safety and quality is an integral part of national programmes for development.

Emphasis is placed on the prevention of chemical and biological hazards which result from contamination, adulteration or simple mishandling of foods.

The agricultural sector dominates the economies of most developing countries.

Pesticides are important in modern farming and will remain indispensable for the foreseeable future : Without their use it would be practically impossible to produce the enormous quantities of food that are required to feed the world's population.

Pesticides include many hazardous substances which must be applied with utmost care in the most effective manner to protect crops.

Effective pest control requires pesticides of good quality. Regulatory analysis and testing of pesticide formulations is an integral part of government control of pesticides in most developed countries.

If pesticides are of poor variable quality, the users will apply higher rates than indicated on the label leading to residues exceeding Maximum Residue Levels (MRLs) and causing problems in international trade. MRLs have been fixed for various items of food i.e. vegetables, fruits, grains, spices, milk, and milk products, fish, meat and poultry, eggs etc.

Presence of highly toxic impurities in pesticides poses another problem e.g. nitrosoamines and toxic dioxins.

Unfavourable storage conditions may lead to the decomposition of pesticides to produce degradation products more toxic than the active ingredient. **Hence the first step is the provision of good quality pesticides.**

Some cases of pesticide poisoning – homicidal ,suicidal and accidental are discussed.

Suggestion for future research in pesticide residue levels in certain commodities are made with a view to improving the quality of such commodities. They are underground roots and leafy vegetables, rice etc.,

BOTANICAL AND OTHER NATURAL CHEMICAL ALTERNATIVES TO PESTICIDES

Vijaya Kumar

Botanicals like Tobacco (*Nicotiana tabacum)* and Kohomba (Neem, *Azadirachta indic)* extract have been extensively used in crop protection throughout the ages. The advent of synthetic insecticides, marketed in stable, extremely effective and readily available forms made botanicals less desirable to the farmer and led to their displacement.

Recent interest in botanicals have been prompted both by environmental concerns and by the successful development of synthetic pyrethroids based on the constituents of the natural pyrethrum and formulations from Neem as successful crop protection agents. Tobacco extract itself exemplifies the fact that botanicals are not necessarily harmless to man, even though their environmental degradation is often faster than that of synthetic insecticides. Fortunately there does not appear to be a direct correlation between toxicity to insects and mammalian toxicity.

Botanicals with insect growth regulatory (IGR) activities are effective crop protection agents. Usually resistance by insects to them is not easily developed and they are most often of low mammalian toxicity. Even so, they do not seem to be readily acceptable to the farming community as they do not show immediate knock-down effects and there appears to be a need to educate the farmer on their advantages.

There is very little folk-lore information on crop protection agents, compared with that on medicinal plants. We have been screening Sri Lankan plant extract for pesticidal activities in an attempt to develop new pesticides at the Faculty of Science, University of Peradeniya during the past eighteen years. We have isolated some extremely active compounds from some Sri Lankan plants and are studying their potential for use in the field. The strategies available and the problems faced in exploiting such botanicals will be discussed.

Apart from botanicals, it may be possible to use growth hormones to disrupt the life cycles of insects and pheromones to disrupt their mating or to attract them trap them. In Sri Lanka, such methods have been successfully used in the control of coconut pests. Such strategies and their potential for use in pest control will be discussed.

INTEGRATED PEST MANAGEMENT AS AN ALTERNATIVE TO PESTICIDES -DEPARTMENT OF AGRICULTURE EXPERIENCE-

M.H.J.P.Fernando

It is recorded that Sri Lanka has the highest rate of pesticides poisoning in the region. This along with ever increasing knowledge on adverse effects of pesticides on human health, environment and agriculture has caused concerns among those who are responsible for looking into safer alternatives to pesticides.

In this process Integrated Pest Management (IPM) has emerged as one of the best methods which can be adopted for this purpose, with minimum or no use of pesticides.

Though it is difficult to clearly define IPM, as it is considered to be a philosophy in pest management, it can be considered as "the best mixture of control tactics for a given pest problem by comparison with the yield, profit and safety of alternative mixes".

The food crop production uses the bulk of pesticides in Sri Lanka. In 1984 Department of Agriculture started its first IPM programme with rice, as it is the most widespread crop using a very high pesticide input and grown in an Eco-system, which can contribute to widespread pollution.

In agriculture, if IPM to be successful it is very important that the farmers must be knowledgeable
about the Eco-system and the production system of whatever crop they grow so that they are able to take appropriate decisions for the management of pests rather than dependent on calendar recommendations of application of pesticides.

With support from FAO the Department of Agriculture has trained officers of the Department of Agriculture, provincial Department of Agriculture, NGOs and others as trainers of farmers on the IPM concept and this is an ongoing activity.

Pre-and post evaluation of the IPM programme of the Department of Agriculture and other organisations have clearly shown it to be very effective in reducing use of pesticides by the rice farmers who practised them.

Though the highest level of overuse of pesticides is in the vegetable sector, the Department of Agriculture has still not launched an active programme of IPM on them. This has been tested only on pilot scale on these crops and the results appear to be very encouraging. The government in its policy statement has identified IPM as a strategy for control of pests in agriculture.

SUICIDE, PESTICIDES AND PROSPECTS FOR SUICIDE PREVENTION IN SRI LANKA

Kalinga Tudor Silva

Recent discussions on the suicide problem in Sri Lanka have paid excessive attention on the predominant method of committing suicide, namely chemical pesticide poisoning, without paying sufficient attention to the deeper social, economic, political and psychological causes of deliberate self harm on the part of humans. While ready availability of deadly chemical poisons is certainly an important factor in suicide mortality in parts of Sri Lanka, it does not explain why people want to end their lives. The analysis of suicide case histories often reveal repeated attempts and multiple causes, including alcoholism, domestic violence, marital instability, gender inequality, physical and sexual abuse, displacement and social injustice. The predominant method of committing suicide has changed over the years and are currently changing in parts of Sri Lanka, with kaneru and weapons (especially hand grenades) becoming more significant as substances used in suicide attempts in certain parts of Sri Lanka. This highlights the limitation of focussing too much on the method of committing suicide in prevention efforts. The main argument of this paper is that deeper causes of problems associated with rural life such as, chronic poverty, marital instability, alcoholism, social injustices, anomie, gulf between aspirations and reality and absence of alternative copying mechanisms must receive greater attention in suicide prevention efforts.

THE ROLE OF PESTICIDE INDUSTRY IN PESTICIDE POISONING MANAGEMENT

Upali Gangoda

The greatest challenge today's agriculturists have to face is meeting the increasing world food demand. Since the world population is continuously growing and the area under cultivation cannot be increased significantly to match, the amount of land per person is getting limited. Therefore, it is clear that the only way to meet the challenge of producing adequate food is to increase the agricultural productivity. The Integrated Crop Management (ICM) where all agricultural practices are harmonised to meet ecological and economical requirements is the best approach in meeting the challenge of increasing agricultural productivity. In ICM plant protection is a vital component as yield losses around the world due to pests is significant. Similar to ICM, Integrated Pest Management (IPM) where mechanical, biological and chemical pest control methods are used appropriately, is the correct approach in protecting the crops from pest attacks. In modern agriculture, the chemical plant protectant - pesticides plays an important role. Although chemical plant protectants - pesticides are indispensable in today's agriculture, if these inputs are not properly handled, it will cause harm to user and the environment. The Pesticide Industry is constantly looking at ways and means in minimising poisoning caused by improper use of pesticides. The Pesticide Industry is involved in three key areas - Active participation in implementation of Regulations, Introduction of new Technology and Training and education of all personnel involved in handling pesticides in view of minimising incidence of poisoning including occupational poisoning, Intentional (suicide) and accidental poisoning due to improper use of pesticides. The Pesticide Industry is committed to adhere to all the guidelines stipulated in the control of pesticide acts ,other statutory and moral obligations and to extend its utmost co-operation in implementing the act. The Pesticide Industry is involved in creating awareness and stressing the importance of adhering to all the legal requirements among the members as well as Agrochemical distributors, Dealers and farmers. Introduction of low toxic products, products with new mode of actions, improved formulations, improved packaging and new application techniques would assist in minimising the incidence of poisoning as these improved technologies are more user friendly. The Pesticide Industry is continuously looking at new technology to improve the safety of products training and education of "Safe', Effective & Environmentally Responsible Handling of Pesticides" is the most important activity in achieving our objective of proper handling of pesticides at all levels and to avoid incidence of poisoning due to improper use of pesticides. Training and education on safe-use of pesticides not only assist in minimising occupational poisoning but also accidental poisoning and intentional poisoning.

The Pesticide Industry has been working very actively in connection of implementation of the legislation, introduction of new technology, training & education on safe-use of pesticides. All these factors directly or indirectly have an positive effect on pesticide poisoning management. However, there is great need in further strengthening the involvement of all the groups who are partners of pesticide poisoning management, if success if to be achieved within a shorter period of time. More interaction is required between Pesticide Industry, Registration Authority, Health Sector and all other groups who are involved in poisoning management. Only by regular dialogue and more collaboration of different groups who are involved/interested in pesticide poisoning management most suitable, solutions could be identified.

PESTICIDES AND THEIR RELEVANCE TO THE TEA INDUSTRY OF SRI LANKA

Sushila I. Vitarana

Tea, the major foreign exchange earner of Sri Lanka, is also economically important as a major employment generator of the country. Improvement of tea production and quality of made tea is partly decided by control of its pests. Pest management in tea primarily is centered round resistant clones (varieties) with cultural, biological and chemical measures integrated with the clones wherever, possible. Usage of chemical pesticides on tea lands has been carefully managed by way of abandoning the use of potent and long persistent chemicals and restricting the use of other chemical pesticides. As a result, in February 1997, at the International Standards Organization Technical Committee on Tea (ISO/TC), a pronouncement was made from the Chair that the ISO has found Sri Lankan tea to be "the cleanest in the world" in relation to pesticide residues. However, the limited pesticide use on tea still can have its own problems in the form of poisoning of non-target individuals. This paper points out the researchable areas of chemical poisoning due to pesticide use on tea. Attention is focussed on unintentional poisoning of the spraying-gang, willful poisoning at suicidal attempts which is identified as a social problem and the exposure of workers at storage and quarantine sites. Discussion also includes the threats the tea industry may face on account of pesticides, which threats originate with the fears of poisoning on the part of the foreign customers.

ADVERSE HUMAN HEALTH EFFECTS OF PESTICIDES IN SRI LANKA

Nimal Senanayake

With the increasing use of vast quantities of chemicals in agriculture, disorders of toxic aetiology have become a major health problem all over the world. People in tropical countries are particularly at risk because of the indiscriminate use of toxic chemicals. Pesticides, according to an estimate by the World Health Organization in 1985, cause approximately 3 million hospitalizations with 220,000 deaths annually. Over 90% of these poisonings occur in tropical countries.

A survey of deaths due to acute poisoning in the District of Kandy, Sri Lanka from 1967 to 1987 showed that pesticides were the cause in 77% of the cases. A four-fold rise in mortality due to poisoning was apparent during the 20 years. Of the pesticides, organophosphorus insecticides (OPI) have emerged as the major contributor to morbidity and mortality, in Sri Lanka and many other tropical countries.

Self-poisoning with suicidal intent is a major problem in the developing agricultural countries, and is responsible for over 90% of the pesticide-related mortality. The majority of these patients are young males with a mean age of about 25 years. Occupational exposure also occurs, for instance, during spraying using faulty equipment or faulty techniques. Accidental ingestion of insecticides stored in households may also cause poisoning. Mass poisonings have occurred due to contamination of food items and accidents during storage, particularly when stocks catch fire. Low-grade exposure can occur, particularly among farmers, the >orange picker=s flu= in the United States of America, probably, being an example. Neurobehavioural effects of chronic exposure to pesticides are a growing concern all over the world.

The nervous system is a common target for the action of many of these toxic agents. The same agent may produce different neurological manifestations; conversely, different agents may produce the same manifestation. No part of the nervous system is immune, and any structure from the brain to the skeletal muscle may be affected, as exemplified by the intermediate syndrome, delayed polyneuropathy and extrapyramidal disorders caused by organophosphorus insecticides described by us.

This paper highlights the human health hazards of the oraganophosphorus and other pesticides.

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