



TOGETHER
for a sustainable future

OCCASION

This publication has been made available to the public on the occasion of the 50th anniversary of the United Nations Industrial Development Organisation.



TOGETHER
for a sustainable future

DISCLAIMER

This document has been produced without formal United Nations editing. The designations employed and the presentation of the material in this document do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations Industrial Development Organization (UNIDO) concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries, or its economic system or degree of development. Designations such as “developed”, “industrialized” and “developing” are intended for statistical convenience and do not necessarily express a judgment about the stage reached by a particular country or area in the development process. Mention of firm names or commercial products does not constitute an endorsement by UNIDO.

FAIR USE POLICY

Any part of this publication may be quoted and referenced for educational and research purposes without additional permission from UNIDO. However, those who make use of quoting and referencing this publication are requested to follow the Fair Use Policy of giving due credit to UNIDO.

CONTACT

Please contact publications@unido.org for further information concerning UNIDO publications.

For more information about UNIDO, please visit us at www.unido.org

RESTRICTED

18769

DP/ID/SER.A/1430
22 January 1991
ORIGINAL: ENGLISH

RESEARCH AND DEVELOPMENT IN PESTICIDES

DP/CPR/80/608

THE PEOPLE'S REPUBLIC OF CHINA

Technical report: Proceedings of the seminar and recommendations*

Prepared for the Government of the People's Republic of China
by the United Nations Industrial Development Organization,
acting as executing agency for the United Nations Development Programme

Based on the work of a UNIDO staff member

Backstopping officer: Mr. B. Sugavanam, Chemical Industries Branch

United Nations Industrial Development Organization
Vienna

* This document has not been edited.

V.91 20503

PREFACE

Exactly 50 years ago DDT was introduced to control malaria and since then pesticides have played a vital role for the survival of mankind in food production and in public health. During this half-century we have witnessed inventions which revolutionized the pesticide industry both in terms of high level biological activity and greater safety of man and his environment. These inventions have made the greatest impact during the last two decades when the systemic/eradicant fungicides based on benzimidazole and azoles, insecticides such as pyrethroids and avermectins, herbicides such as glyphosate, the sulphonyl ureas and imidazolinones, and plant growth regulator such as paclobutrozol have been introduced. In addition, we have seen great strides made in the formulation and application technologies all of which pushed the potential yield of crops towards their maximum.

However, owing to problems created by old persistent and toxic pesticides and the complex interaction among various matrices in the eco-system, pesticides are coming under the close scrutiny of the environmentalists, the politicians and above all the press. With greater restrictions, and more information to be generated for registering a new pesticides, the cost of development has risen from around \$2 million in 1950s to almost \$50 million in the 1980s and it takes around 6 to 10 years to place a pesticide in the market.

With the recent success in R&D of inventing such new highly active compounds, finding new toxophores is becoming a daunting task and companies are putting more emphasis on formulation/application technologies and in bio-pesticides and above all on seed technology.

Whilst the developed countries reap the benefits of modern pesticide R&D, the developing countries still lag a long way behind in taking advantage of the various advances made in pesticides. This gap is widening due to lack of knowledge and the absence of the necessary contacts to carry out collaborative research and development and in the adaptation of new technology.

One of the aims of the United Nations Industrial Development Organization (UNIDO) is to conduct high level technical conferences in developing countries to expose the national and regional experts to changes taking place in the technology of different sub-sectors of industries and promote North-South and South-South co-operation for a safe and sound industrial development.

Contents

	Pages
PREFACE.....	2
INTRODUCTION.....	4
AGREED CONCLUSIONS AND RECOMMENDATIONS.....	5-9

Chapter

I. OFFICIAL OPENING OF THE INTERNATIONAL SEMINAR AND THE INAUGURATION OF THE BIO-ASSAY LABORATORIES.....	10
II. SUMMARIES OF THE SESSIONS.....	11
III. TOPICS FOR GROUP DISCUSSIONS.....	13

Annexes

I. List of participants.....	15
II. Programme of the seminar.....	17
III. Organizing Committee.....	23
VI. Poster titles presented in the seminar.....	24

INTRODUCTION

Under the sponsorship of the UNDP and the United Kingdom of Great Britain and Northern Ireland contribution to UNIDO and the United Nations Industrial Development Fund (UNIDF), UNIDO has been providing technical assistance to China in strengthening Shenyang Research Institute, Shenyang, to carry out biological and toxicological evaluation of pesticides and their formulations for use in China. The project was completed in 1990 and in order to expose the experts in China to recent developments in the field of pesticides it was proposed to hold an international forum to discuss the possible co-operation between the developed and the developing countries (North-South). In order to achieve this goal, a seminar entitled 'Recent Developments in the Field of Pesticides and their Application to Pest Control in China and other Developing Countries of the Region' was organized and was funded by the UNDP and from the Chinese Government contribution to UNIDO under the United Nations Industrial Development Fund (UNIDF). The new laboratories were formally declared open during the seminar. The seminar was held at Shenyang, China from October 8 - 12, 1990.

The participants were carefully chosen from well known industries, research institutions and Government organizations based on their research work, and international/national standing in the subject of pesticides. The subject itself covered all aspects starting from pesticides invention to their fate in the environment and also the outlook in the 21st century for pesticides. The seminar also included poster session mainly by experts from China with a few posters from outside China.

AGREED CONCLUSIONS AND RECOMMENTATIONS

Conclusions

It was agreed by all participants that such an international seminar with many participants from well known industries was very rarely organized in developing countries and the impact of the seminar was well appreciated as it gave the opportunity for close discussions between national and international participants.

The seminar was very highly appreciative of the number of group discussions arranged on topics of great relevance to developing countries especially over the problems that could be solved by close co-operation between developed and developing countries.

The seminar put more emphasis on formulation, environmental safety and management of resistance to pesticides. These are the areas in which the meeting clearly recognized the role of international organizations to assist developing countries for a sound and safe development of pesticide industry.

Recommendations

i) Having discussed the capability available in some developing countries to design compounds from basics and considering the fact that no major pesticides were developed in developing countries the group recommended that:

- capable developing countries should adapt a broad based approach to discovering new pesticides based on natural products and synthesizing novel compounds and collaborate with major companies for development.

ii) Having realized the manufacturing potential of many developing countries the group recommended that:

- collaboration with major manufacturing countries to ensure cost effective and safe production and above all collaboration among developing countries as a way forward particularly with respect to manufacture.

Recommendation 2

The group having considered in detail various bacterial diseases, virus diseases, insecticide resistance strains, pest with resurgent potential, nematodes and having seen similarity in some of the requirements between developed and developing countries recommended to find ways and means to develop:

- pesticides based on natural products, good aphicides, oviposition inhibitors, nematocides and soil fungicides.

Recommendation 3

i) Having considered the crucial need for safety and cost effectiveness of pesticides targeted for developing countries, the group strongly recommended assistance to developing countries:

- for end user education
- to industry to supply formulations with low toxicity, easy to use, and provide suitable protective clothing to workers in industry and in the field.

ii) Having discussed lack of availability of pesticides in many developing countries, it is recommended that assistance should be given to developing countries:

- to concentrate on the manufacture of formulations that are safer and cost effective and on the production of carefully selected commodity active ingredients.
- to assist in getting licensing agreements to manufacture new active ingredients (patented products)

iii) Having taken into account the complex and expensive nature of pesticides discovery it is recommended that developing countries are not in a position to carry out such a costly exercise and should carefully consider their resources (also refer to Recommendation 1).

Recommendation 4

The group having considered the fact that there will be a general increase in pesticide production/use to support the increasing population and also that sub-standard pesticides are being used in the region it strongly recommended assistance to:

- industry to improve their quality standards
- government to implement quality control of agrochemicals.

Recommendation 5

Having discussed in detail problems faced by industry in developing countries to produce newer/safer pesticide formulations, and the commonly produced e.c., dust and w.p. being less safe the group strongly recommended assistance:

- to industry to promote production of safe, reasonably priced, high quality formulations in the developing countries.

Recommendation 6

i) Having discussed formulations such as seed treatment/granular application and taking into consideration various advantages (including environmental) of their formulations, the group recommended assistance to:

- industry to make these safer during production and handling and including establishing centralized seed treatment facilities.

ii) Taking into account definite advantages of ULV application the group recommended:

- care to be taken on drift problems
- industry to make available more formulation types and to provide effective machinery
- educating the operators and creating local special teams for spray applications
- use of safer spray type formulations adaptable to existing conventional application techniques/equipment.

Recommendation 7

i) Having discussed the framework of IPM, and having defined various agronomic/cultural practices, the meeting recommended that the following items should be advocated in such a system:

- use of pest/disease resistant crops
- correct timing of pesticide application(s)
- crop rotation, intercropping
- water management
- effective formulations for seed treatment
- correct choice of safe and effective pesticides
- use of appropriate application techniques.

ii) Having considered the inter-disciplinary nature of such a task the meeting strongly supported:

- close interaction between industry/government
- subsidies or assistance to industries to produce and supply effective application equipment instead of subsidizing pesticides.

iii) The group having taken into consideration the importance of farmers and operators recommended:

- government and industry collaborate to train farmers/extension workers.

Recommendation 8

Having discussed natural products from plants, microbe sources and microbial agents and taking into consideration the expectations the meeting recommended:

- this field still offers scope to generate leads and needs more co-ordination among different organizations for modifications and commercialization and assistance from UNIDO/FAO

Recommendation 9

i) Fungicide Resistance

Having discussed realization of the use of fungicides in developing countries and the recent exhaustive work on resistance management the meeting strongly recommended:

- use of mixture formulation
- use of disease resistant crop varieties
- judicious use of fungicides

ii) Herbicide Resistance

The group having felt that herbicide resistance is limited in developing countries but to be on the cautious side and prevent large scale resistance the group recommended to:

- avoid repetitive use of single herbicides and make different type herbicides available to farmers
- maintain close watch on performance of herbicides.

iii) Insecticide Resistance

Having deep concern about large scale occurrence of insect resistance in China and the region the meeting strongly advocated:

- importance of understanding of the biology of the insect or other pests
- integrated strategies appropriate to different geographical situations and agricultural systems
- importance of educating advisers/farmers on detecting early warning system.

iv) Having recognized the need for Integrated Resistance Management (IRM) with a sound communication network exchanging information between industrialized and non-industrialized countries and information filtering through to producers and users the seminar recommended close collaboration between UNIDO/FAO to assist developing countries.

Recommendation 10

Having discussed the expertise available with an Organization such as UNIDO, the meeting recommended:

- close liaison be kept with other organizations such as FAO, WHO to implement recommendations especially on IPM
- training of workers both in industry and in the field
- follow up of projects after end of assistance is vital
- to provide a catalytic effect to industry in modernizing their plant, promote clean and well understood technology and not just the cheapest. Countries like Malaysia and Thailand are good examples
- to promote massive investment in upgrading established plants.

Recommendation 11

Having discussed all aspects related to pesticide development through the international seminar, the meeting strongly recommended:

- similar high level technical seminar conducted once in 3 or 4 years in an advanced developing country.

I. OFFICIAL OPENING OF THE INTERNATIONAL SEMINAR AND THE
INAUGURATION OF THE BIO-ASSAY LABORATORIES

Opening ceremony and inaugural function

Huang Jianmei, the Director of Shenyang Research Institute of Chemical Industry, thanked UNDP/UNIDO and the Government of the United Kingdom of Great Britain and Northern Ireland for assisting in the organization of the meeting and pointed out that the seminar would exert an important influence on the research and development of pesticides in Liaoning Province. She said that the completion of the project would have great significance in strengthening capabilities in research and development of pesticides in the Shenyang Research Institute. She thanked the Ministry of Foreign Economic Relations and Trade, the Ministry of Chemical Industry, the Government of Liaoning Province and Shenyang Municipality for all the assistance given to the project.

Zhang Gengxin, Director of Foreign Affairs Department, Ministry of Chemical Industry, after welcoming the participants, stressed that in a country like China agriculture is the foundation of the national economy and pesticide production is the mainstay for agricultural development. He informed the meeting that with the completion of the project, pesticide R&D work will be promoted by the Ministry of Chemical Industry. He especially mentioned that 49 papers and posters would be presented and that the seminar would be a very important international academic activity which would provide Chinese and foreign experts with a good opportunity for technical exchange.

Shun-ichi Murata, Assistant Resident Representative, UNDP, said that the task was given to the UN System to improve production in the agricultural sector because the country had to import 10 billion kg of grain last year to feed the population. He said that farmers complained that the prices of chemical fertilizers, pesticides and diesel fuel were rising at a fast rate and that grain growing in China was becoming less and less profitable. He expressed the hope that an harmonious interplay between institutions of R&D, application and production should be cultivated. He emphasized that a sound management practice would improve the manufacturing processes and safety as well as reduce wastage of raw materials. He wanted the Ministry of Chemical Industry and Ministry of Agriculture to interact in order to achieve a common objective in improving the quality of life in China.

A Senior Industrial Development Officer, Chemical Industries Branch, UNIDO, in his address emphasized the importance of the seminar to China and to other countries of the region since it covered all aspects relating to pesticides and their relevance to developing countries. He also stressed the importance of promoting North-South and South-South co-operation in discussing pesticide technology and how it could be used for the benefit of the region without adverse effect on the environment.

Li Yonghao, Ministry of Economic Relations and Trade, pointed out the excellent co-operation among UNDP/UNIDO, Ministry of Chemical Industry and Shenyang Research Institute in assisting the development of pesticide and human resources. He also pointed out the importance of economic and technical co-operation in the framework of UN organizations and other international institutions to improve South-South co-operation.

The meeting placed on record its appreciation of the help provided by UNDP/UNIDO/United Kingdom and China.

On the 2nd day of the seminar the Bio-assay Laboratories were inaugurated (see Annex I, Programme for Inaugural Function). The Vice Minister of the Ministry of Chemical Industry, Lin Yincai, was the chief guest and in his inaugural speech he thanked UNDP/UNIDO/United Kingdom and the Ministry of Foreign Economic Relations and Trade of China for their generous assistance. He added that the centre will promote scientific research on pesticides in China and will lay a foundation for the co-operation between China and other countries of the world in promoting North-South and South-South co-operation. The Bio-assay Laboratories were formally opened by cutting the ribbon and to the sound of fire crackers. The conducted tour of the facilities was followed by a visit to an agricultural farm at Ma-bei village and the university at Shenyang.

II. SUMMARIES OF THE SESSIONS

The seminar covered different topics in each session. Before starting of the sessions the meeting placed on record its deepest sympathy and condolences on the sudden demise of Quin Geering who had contributed immensely to the project and to the seminar.

Monday 8. 10. 1990

The first day of the seminar covered broadly aspects related to pesticide discovery/recent developments in the chemistry of pyrethroids, triazoles and translocation of pesticides. Speakers from well known organizations covered the complexities involved, the inter disciplinary nature of the discovery of pesticides and the rising costs of developing new pesticides. The meeting also discussed the development of the pesticide industry in China. The session clearly recognized the complex chemistry and the cost involved in modern times to invent new pesticides.

Wednesday 10. 10. 1990

On the 3rd day of the seminar the emphasis was on the recent developments in pesticide formulation technology and development of natural products.

The formulation session clearly emphasized the importance of safety in formulation and noted that the technology is moving towards water based formulations and as well as developing dust free solid formulations for reducing risk of exposure to the workers. The session also discussed problems related to wearing safety equipment in tropical countries and the importance of doing further work in the area of developing protective clothing suitable for developing countries.

Application technology suitable for developing countries was presented and the use of pesticides, taking advantage of the directional behaviour of cotton leaves and peanuts during day and night time, was shown to cover the under surface of the leaves. The natural products session covered various bio-pesticides used in Japan on diseases common to the Asia region and the importance of careful usage of new pesticides to derive benefits from products of microbial origin.

Among the natural products, the great potential of the neem tree was discussed and also how the industry was slowly introducing neem-based pesticides after hesitating for a number of years. The problem of registration of botanical extracts was discussed but the very fact that countries like the United States of America are introducing these pesticides meant that the registration problems were being overcome.

A number of useful potential botanical pesticides were presented and it was the general opinion that there is a gold mine in this area, but mining of gold could be very expensive and time consuming.

Thursday 11.10.1990

The 4th day of the seminar had two sessions allotted to the major problems faced by developed and developing countries alike, to resistance of pests and resurgence of pests which in the past were not significant. Experts both from the developed and the developing countries emphasized the great prudence needed in the use of pesticides, careful monitoring of pest problems and their susceptibility, industry/government collaboration and the various means available to overcome the problem of resistance.

The 2nd session of the day was solely devoted to UNIDO's activities in pesticides in developing countries covering the establishment of pilot plants for formulations, establishment of R&D laboratories in pesticide formulation and the toxicology laboratory in the Republic of Korea. The Regional Network on Pesticides for Asia and the Pacific (RENAP), executed by UNIDO in association with WHO, FAO, World Bank and ESCAP, was presented by the Regional Coordinator who brought to the attention of the meeting UNDP/UNIDO's innovative concept of bringing together countries in Asia to discuss and exchange their experience with technical co-operation among developing countries (TCDC) in the form of workshops, expert group meetings and in particular the formation of technical Coordinator Units in special areas where expertise exists within the region. In this connection the Regional Coordinator put on display the new journal which had just been released by RENAP.

Friday 12.10.1990

The last day of the seminar was devoted to environment and ecotoxicology related to pesticides, registration, groundwater contamination and non-conventional pesticides. The final paper presented was on pesticides in the 21st century. It dealt with changes already taking place in the introduction of specific optically active isomers, toxicological evaluation more related to human beings, the move towards reliable in-vitro tests and thereby reducing experiments on live animals and introduction of more biologicals in the market.

The seminar came to an end with concluding remarks by the Chairman and a vote of thanks to all those who had directly or indirectly contributed to the success of the seminar.

Each day during the seminar work group discussions (13 work groups altogether) were held and a number of recommendations were made based on reports from the Rapporteur of each session.

The proceedings of the seminar will be published later. The general consensus was that such a seminar should be conducted once in 3 or 4 years in an advanced developing country.

III. TOPICS FOR GROUP DISCUSSIONS

Day 1

1. Can the developing world afford rationale pesticide design and do they have the technology to manufacture complex molecules?

Chairman, Mr. L. Copping (UK)

Rapporteur, Mr. A.K.M.F. Kabir
(Bangladesh)

2. What new or different pesticide targets are there in developing countries? Are they different from Europe, USA and Japan? Can pesticide discovery be regional?

Mr. B. Sugavanam, (UNIDO)

Mr. Rapporteur, R.C Saxena
(Philippines)

3. What special properties are needed for pesticides targeted for third world agriculture? (Mobility, persistence, spectrum, activity level, mode of action, etc).

Mr. K. Holly (UK)

Rapporteur, Mr. B. Thomas (UK)

4. Will population/economic factors lead to an increased dependence on crop protection agents? Will there be a population shift from the farm to urban/industrial life styles?

Chairman, Mr. K.J. Brent (UK)

Rapporteur, Mr. G.A. Matthews (UK)

Day 2

5. What formulation types are preferred for developing countries? Should they be crop specific?

Chairman, Mr. K.J. Brent (UK)

Mr. A. Kabir (Bangladesh)

6. Will application techniques render crop protection more efficient? Do we have the correct formulations for new application equipment?

Chairman, Mr. L. Copping (UK)

Rapporteur, Mr. K.H Kuck (FRG)

7. Should we concentrate on improved cultural/agronomic practice rather than chemical crop protection?

Chairman, Mr. B. Sugavanam (UNIDO) Rapporteur, Mr. B. Thomas (UK)

8. What can we learn from experience with natural products? Is there really a gold mine waiting to be discovered?

Chairman, Mr. K. Holly (UK) Rapporteur, Mr. D. Mangold (FRG)

Day 3

9. What strategies should be adopted to avoid the onset of insect resistance? What species and crops are particularly at risk?

Chairman, Mr. K. Holly

10. What approaches should be taken to prevent the development of disease resistance? Where is there likely to be a major problem?

Mr. L. Copping (UK)

Mr. B. Thomas (UK)

11. Is the possibility of herbicide resistant weeds a cause for concern? If so how can it be avoided?

Mr. K.J. Brent (UK)

Mr. C.E. Price (UK)

12. How can UNDP/UNIDO improve the efficiency of its aid/education programmes?

Mr. B. Sugavanam (UNIDO)

Mr. N.W. Forester (Australia)

Day 4

13. All groups - What single take-home message is there for developing countries from this meeting?

Chairman, B. Sugavanam (UNIDO)

List of Participants from outside China

Name	Country	Unit	Address
Umar K. BALOCH	Pakistan	Pakistan Agricultural Research Council	P.O. Box 1031 Islamabad, Pakistan
T. BHUDHASARAI	Thailand	Entomology and Zoology Division	Bangkok 10900 Thailand
Bing CHEN	USA	EMC, ACG Group, Asia Pacific	H.K. FHC Far East Ltd. RM 410 World Finance Center, M. Tower, Harbour City T.S.T. Kowloon. HONG KONG
K.J. BRENT	UK	Department of Crop and Environmental Sciences Long Ashton Research Station University of Bristol	Bristol BS18 9AF
C.A. CAUCHAT	Switzerland	Ciba-Geigy	Hong Kong
L.G. COPPING	UK	Dow Elanco Ltd. Letcombe laboratory	Wantage, Oxford OX29JT
S.P. DHUA	India	Regional Co-ordinator Unit REMPAP	UNDP, 55 Lodhi Estate New Delhi
D. EBERLE	Switzerland	Ciba-Geigy	Ciba-Geigy AG, Agricultural Division
M. ELLIOTT	UK	Crop Protection Division AFRC Institute of Arable Crops Research Rothamsted Experimental Station	Harpden Herts, AL52JQ England
M. W. FORRESTER	Australia	Department of Agriculture and Fisheries	Marrabri, NSW 2390
K. HOLLY	UK	36 Sunderland Avenue	Oxford OX2 8DX
E.M.F. Abdul KABIR	Bangladesh	Jute Research Institute	Dhaka
K.H. KUCK	Germany	Bayer AG	Bayerwerk, 09C Leverkussen
Eva KLEINER	Germany	Institute for Tropical Agriculture Leipzig University	Fichtestrasse 28 7030 Leipzig
Zhang LULU		Ciba-Geigy	Hong Kong
J. MARTEL	France	Roussel Uclaf Center de Recherches de Romainville	102 route de Moisy 93290 Romainville
D. MANGOLD	Germany	AG Research and Development Central Agricultural Research Station	BASF Aktiengesellschaft, Postfach 220 D.6767, Limbergerhof
G.A. MIANA	Pakistan	c/o Dr. U.K. Baloch Pakistan Agricultural Research Council	Dept. of Chemistry, Comal University, D.L. Khaw, Pakistan

Name	Country	Unit	Address
J. MIYANOYO	Japan	Takarazuka Research Centre Sumitomo Ltd.	Hyogo-Ken
G. MATOLCSY	Hungary	Plant Protection Institute Hungarian Academy of Sciences	B-1525 Budapest Hungary
G.A. MATTHEWS	UK	International Pesticide Application Research Centre Imperial College at Solwood Park	Sunninghill, Ascot Berkshire SL57PY England
S. MURATA	Japan	UNDP	Beijing, China
MAGAI	Japan	Sumitomo Ltd	Hyogo-Ken
J.R. PLIMMER	USA	US Department of Agriculture Agricultural Research Service Environmental Chemistry Laboratory Beltsville Agricultural Research Center-W	Beltsville, MD 20705 U.S.A.
C. E. PRICE	UK	Imperial College at Silwood Park Department of Biology	Ascot, Berks, SL5 7PY England
G.P.V. REDDY	India	Agricultural College	Bapatla Andhra Pradesh
J.K. ROH	Rep. of Korea	Toxicology Research Center	100, Jang-Dong, Yusong-GU
R. SAXENA	Philippines	International Rice Research Institute	Manila
H.A. SLADEN	Canada	E.M.C. Corporation	P.O. Box 8, Princeton New Jersey
H. SASTROHAMIDJOJO	Indonesia	University of Gadjah Mada	Yogyakarta, Indonesia
B. SUGAVANAN	UK	UNIDO	Vienna
T. TADROS	UK	Senior Research Associate, Agrochemical Division, Jealott's Hill Research Imperial Chemical Industries Ltd.	Bracknell Berkshire England
B. THOMAS	UK	Schering Agrochemicals Limited Chesterford Park Research Centre	Saffron Walden Essex
G. VOLPP	USA	P.M.C. Corporation	P.O. Box 8, Princeton New Jersey
R. WONG		Ciba-Geigy	Hong Kong
I. YAMAGUCHI	Japan	RI Ken, The Institute of Physical and Chemical Research	Wako, Saitama, 351-01 Japan
Z. ZHEWEN		BASF China Ltd.	Hong Kong

Annex II

PROGRAMME

Sunday, 7 October 1990

Registration and reception

Monday, 8 October 1990

MORNING SESSION:

Chairman: B. Sugavanam, UNIDO, Vienna, Austria

CPR/ 8.30 - 9.00

Opening of Conference by Madame Huang Jianmei
Director, Shenyang Research Institute, Shenyang,
China

1 9.00 - 9.40

The Status of Pesticide Research in China
Li Zong Cheng, Shenyang Research Institute,
Shenyang, China

2 10.00 - 10.40

Aspects of Pesticide Discovery
L.G. Copping, Dow Elanco Ltd, Wantage, United
Kingdom.

3 10.40 - 11.20

**Product Development from "Candidate to
Product"**
D. Mangold, BASF, Limburgerhof, Germany

4 11.20 - 12.00

**Natural and Synthetic Pyrethroid
Insecticides**
M. Elliot, Rothamstead Experimental Station,
Harpenden, United Kingdom.

AFTERNOON SESSION:

Chairman: L.G. Copping, Dow Elanco Ltd, Wantage,
United Kingdom.

5 13.30 - 14.10

Deltamethrin - A Process Challenge
J. Martel, Roussel Uclaf, Romainville, France

6 14.10 - 14.50

Development of Azole Fungicides
K.H. Kuck, Bayer AG, Leverkusen,
Germany

15.10 - 15.50

**Molecular Requirements for Translocation
of Pesticides in Plants**
Clive Price, Imperial College at Silwood Park,
Ascot, United Kingdom.

15.50 - 17.30

Workshop Discussion/Roundup

20.00 - 21.30

Poster Session

Tuesday, 9 October 1990

MORNING SESSION:

Inauguration of the Biology Laboratories
Leave Hotel at 8.00

9.30 - 10.10

Inaugural Function

10.10 - 13.00

Tour of the Laboratories in four groups

13.00 - 17.00

Visit to Agriculture University and a Farm

WEDNESDAY, 10 October 1990

MORNING SESSION:

Chairman: K. Brent, Long Ashton Research
Institute, Bristol, United Kingdom.

8 8.30 - 9.10

Spray Formulations

T. Tadros, ICI, Jealott's Hill Research Station,
United Kingdom.

9 9.10 - 9.50

**Modern Formulations - Key to Safe Use of
Plant Protection Products**

D. Eberle, Ciba-Geigy, Munchwilen, Switzerland

10 10.10 - 10.50

Plant Protection in Tropical Countries

G Frölich and Eva M. Kleiner, Inst. for Tropical
Agriculture,
Germany

11 10.50 - 11.30

**Changes in Application Technology to
Meet Operator and Environmental Safety
Standards**

G. Matthews, Imperial College at Silwood Park,
Ascot, United Kingdom

12 11.30 - 12.10

**Implications of Biological and
Pesticidal Behaviour in Chemical Control
of Pests**

Tu Yu Quin, Research Institute of Plant
Protection, West Yuan ming, Haidian, Beijing,
China,

AFTERNOON SESSION:

Chairman: K. Holly, Consultant, Oxford,
United Kingdom.

13 13.30 - 14.10

**Natural Products and Their Commercial
Potential as Pest Control Agents: Focus
on Fungicides of Microbial Origin**

I. Yamaguchi, Inst. of Physical and Chemical
Research, Saitama, Japan

- 14 14.10 - 14.50 **Natural Products and Their Potential for the Asian Region**
R. Saxena, International Rice Research Institute, Manila, Philippines
- 14.50 - 15.10 **Afternoon Break**
- 15 15.10 - 15.50 **Studies of Plants as Sources and Models of Insect Control Agents**
Shang Zhi-Zhen, Institute of Elemento-organic Chemistry, Tianjin, China
- 16 15.50 - 16.10 **Natural Products as Pesticides - Their Potential in Pakistan**
G.A. Miana, Department of Chemistry, Gomal University, D.L. Khan, Pakistan
- 16.10 - 17.00 **Workshop Discussion**
- 20.00 - 21.30 **Poster session**

Thursday, 11 October 1990

MORNING SESSION:

Chairman: B. Thomas, Schering Agrochemicals Ltd, Saffron Walden, Essex, United Kingdom

- 17 8.30 - 9.10 **Prediction and Avoidance of Resistance to Insecticides**
N.W. Forrester, Dept. of Agriculture, Narabri, New South Wales, Australia
- 18 9.10 - 9.50 **Prediction and Avoidance of Fungicide Resistance Problems**
K. Brent, Long Ashton Research Station, Bristol, United Kingdom
- 19 10.10 - 10.50 **Resistance to Herbicides: Occurrence, Prediction and Avoidance**
K. Holly, Consultant, Oxford, United Kingdom
- 20 10.50 - 11.30 **Resistance Problems in Rice Crops in Thailand,**
~~Thamnoon Bhudhasamjai~~, Vantana Telvapuchon, Sawat Somsa-ard, Montri Rumakom, Department of Agriculture, Bangkok, Thailand

21 11.30 - 12.00 **Resistance Problems for the Control of Pests on Cotton in Pakistan**
U.K. Baloch, Pakistan Agricultural Research Council, Islamabad, Pakistan

22 12.00 - 12.30 **Field Weeds and Their Chemical Control in China**
Shao quan Su, The Laboratory of Weed Science, North East Agricultural College, China

AFTERNOON SESSION:

Chairman: R. Saxena, International Rice Research Institute, Manila, Philippines

23 13.30 - 14.00 **UNIDO's Activities on Pesticides**
UNIDO Secretariat, Vienna, Austria

24 14.00 - 14.30 **UNDP/UNIDO Project - Establishment of Toxicology Research Centre, Daejeon, Republic of Korea**
J.K. Roh, Toxicology Res. Centre, Daejeon, Republic of Korea

25 14.30 - 15.00 **UNDP/UNIDO Project - Regional Network on Pesticides for Asia and Pacific (RENAP)**
S.P. Dhua, Regional Co-ordinator Unit, New Delhi, India

26 15.00 - 15.30 **Pesticide Safety Testing in Shenyang Safety Evaluation Centre**
(not presented) Zuoming, Shenyang Research Institute, Shenyang, China

15.50 - 17.00 **Workshop**

Friday, 12 October 1990

MORNING SESSION:

Chairman: N.W. Forrester, Department of Agriculture, New South Wales, Australia

27 8.30 - 9.10 **Pesticide Regulations - An Overview**
B. Thomas, Schering Agrochemicals Ltd., Chesterford Park Research Station, Saffron Walden, Essex, United Kingdom

- 28 9.10 - 9.30 Hazard to Farm Workers from Contamination During Pest Control Operations
(not presented) E.M. Ambridge, Overseas Development Natural Resource Institute, Chatham, United Kingdom
- 29 9.30 - 10.10 Environment-Friendly Pesticides
G. Matolcsy, Hungarian Academy of Science, Budapest, Hungary
- 30 10.30 - 11.10 Pesticides and Groundwater Contamination
J. Plimmer, United States Department of Agriculture, Beltsville, United States of America
- 31 11.10 - 11.30 Fate of Pesticides in the Tea Plantation and Design of Parameters For Selecting Suitable Pesticides
Chen Zong Mao, Wan Haibin, Xia Huilong, Tea Research Institute, Chinese Academy of Agricultural Sciences, China
- 32 11.30 - 11.50 Residue Problems of Pesticides in Both Tropical and Temperate Areas - A Comparative Study
H. Sastrohamidjojo, University of Gadjah Mada, Yogyakarta, Indonesia
- 33 11.50 - 12.20 Integrated Pest Management
(not presented) D. Lyon, Overseas Development and Natural Resource Institute, Chatham, United Kingdom
- 34 12.20 - 12.40 Integrated Pest Management: The Indian Experience
G.P.V. Reddy, Agricultural College, Bapatla, Andhra Pradesh, India
- 35 12.40 - 13.00 Integrated Pest Management in Jute and Allied Fibre Crops
K.M.F. Abul Kabir, Jute Research Institute, Dhaka, Bangladesh

AFTERNOON SESSION:

Chairman: B. Sugavanam, UNIDO, Vienna, Austria

- 14.00 - 15.10 **Forum for discussions**
- 36 15.30 - 16.10 **Pesticides in the 21st Century**
 J. Miyamoto, Takarazuka Research Centre, Sumitomo
 Ltd., Hyogo-Ken, Japan
- 16.10 - 16.40 **Closing Remarks**
- Addendum:** Item No 33 was replaced by a talk on application technology by
 G. Matthews (UK)

Item No 28 was replaced by F.M. Sulaiman, C/o Regional
Agricultural Research Centre, Makandura, Gonawila (NWP), Sri Lanka
who presented a paper on "Pest management in Sri Lanka with due
regard to ecological principles"

Annex III

1.2 Organizing Committee

K. Brent	Long Ashton Research Station, Bristol, United Kingdom
Li Zong Cheng	Shenyang Research Institute, Shenyang, China
L.G. Copping	Dow Elanco Limited, Wantage, United Kingdom
Q. Geering	A-Ag Consultancy, Cambridge, United Kingdom
Zhang Gengxin	Ministry of Foreign Affairs, Ministry of Chemical Industry, Beijing, China
K. Holly	British Crop Protection Society, Oxford, United Kingdom
Chen Lihua	Ministry of Foreign Affairs, Ministry of Chemical Industry, Beijing, China
D. Lyon	ODNRI, Chatham, United Kingdom
B. Sugavanam	United Nations Industrial Development Organization, Vienna, Austria

Poster Titles Presented in the Seminar

1. STUDIES OF PLANTS AS SOURCES AND MODELS OF INSECT CONTROL AGENTS

Shang Zhi Zhen
Institute of Elemento-organic Chemistry
Nankai University, Tianjin, China

2. INSECTICIDE RESISTANCES IN *APHIS GOSSEPII* GROWER AND THE COUNTERMEASURES

Han Zhaojun, Tan Fujie,
Wang Yinchang and You Ziping
(Department of Plant Protection, Nanjing Agricultural
University, Nanjing, China)

3. STUDY ON PROPERTY OF MODEL 50E ULV ELECTROSTATIC SPRAYER AND ITS APPLICATION

Shang Heyan and Li Genhui
(Beijing Agricultural University, Beijing 100094)

4. THE NEW USAGES OF SOME SYSTEMIC FUNGICIDES FOR PREVENTING PLANT DISEASES

Guorong Liu and Shiwu Hong

5. DINCLOAZOLE CONTROLLING HEAD SMUT OF CORN IN SEED DRESSING

Guorong Liu, Le-en Yan, Xiaofeng Zhang and Zhiqiang Ma
(The Institute of Plant Protection, Hebei)
Naizhi Liu, Xinpin Wu and Qinghua Zhu
(The Institute of Agri-chemicals inspection,
The Ministry of Agriculture)

6. A STUDY ON THE RESISTANCE AND ITS MECHANISMS OF FENVALEATE, MALATHION AND THEIR MIXTURE UPON THE TURNIP APHID, LIPAPHIS ERYSIMI (KALTENBACH)

Wei Cen Rui Chang hui Fan Xian-lin
Zhao Yong-qao Sun Xiao-ping Wang Wen-lai
(Plant Protection Res. Ins., CAAS)

7. IMPLICATION OF BIOLOGICAL AND PESTICIDAL BEHAVIOURS IN CHEMICAL CONTROL OF PESTS

Tu Yujin

8. RESISTANCE AND RESISTANT MECHANISM OF ORGANOPHOSPHOROUS AND CARBAMATE INSECTICIDES IN MELON-COTTON APHID (APHIS COSSYPII GLOV.) IN BEIJING SUBURBS AND NORTHERN REGIONS OF HEBEI PROVINCE, CHINA.

Zheng Bingzong, Gao Xiwu, Wang Zhengguo, Liang Tongting
(Department of Plant Protection, Beijing Agricultural University)
Cao Benjun
(Institute of Agricultural Applied Chemistry,
Beijing Agricultural University)
Gao Hong
(Science Association Committee, Langfang Region, Hebei)

9. THE FIELD CROP WEED COMMUNITIES AND THEIR CONTROL IN CHINA

Tang Hongxuan

10. STUDY ON WATER-BASE ULV SPRAY TECHNIQUE

Li Fan
(Plant Protection Institute, Chinese Academy
of Agriculture Sciences)

11. FURTHER STUDY ON THE INSECTICIDAL PLANT CHINESE BITTERSWEET, CELASTRUS ANGULATUS MAX.
Wu Wen-jun
(Department of Plant Protection, Northwestern Agricultural University)

12. FATE OF PESTICIDE IN TEA GARDEN AND THE DESIGN OF PARAMETERS FOR SELECTING SUITABLE PESTICIDE FOR TEA PLANTATION USE
Chen Zongtao Wan Haibin Xia Huilong
(Tea Research Institute, Chinese Academy of Agricultural Sciences)

13. USING ECOTOXICOLOGY TO EVALUATE THE SAFETY OF PESTICIDES
Fan Defang
(Zhejiang Agricultural University)

14. PRESENT STATUS AND COUNTERMEASURES OF INSECTICIDE RESISTANCE IN RICE AND VEGETABLE PESTS IN CHINA
Zhen-hua Tang
(Shanghai Institute of Entomology, Academia Sinica, China)

15. PESTICIDE SAFETY TESTING IN SHENYANG SAFETY EVALUATION CENTER
Wang Zuoming
(Pesticide Safety Evaluation Center, Shenyang Research Institute of Chemical Industry)

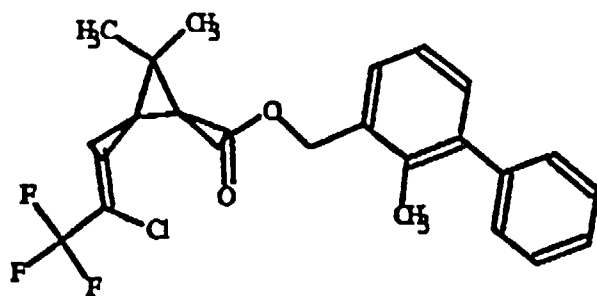
16. THE PROCEDURE OF PESTICIDE REGISTRATION IN CHINA
Zhang Chunjuan
The Institute for the Control of Agrochemicals,
Ministry of Agriculture
17. STUDY ON BEHAVIOR OF DIMEHYPO IN SOILS
Yu Ruwei, Hu Qinhong, Jin Wei, Li Deping
(Institute of Soil Science, Academia Sinica, Nanjing)
18. DEVELOPMENT OF ENVIRONMENT FRIENDLY PESTICIDES
Prof. G. Matolcsy, Hungarian Academy of Sciences
Budapest, Hungary
19. PESTICIDE DEVELOPMENT CENTRE INDIA/ITS ACTIVITIES
Mr. S.P. Dhua, Regional Co-ordinator of RENPAP
Hindustan Insecticides Ltd, Scope Complex, Core-6
7, Lodi, New Delhi-110 003, India
20. DEVELOPMENT OF NOVEL BIOCIDES FORMULATION
Mr. S.P. Dhua/Mr. P.K. Ramdas
Pesticide Development Centre India
Hindustan Insecticides Ltd, Scope Complex, Core-6
7, Lodi, New Delhi-110 003, India

21. **Bifenthrin - A Highly Efficacious Pyrethroid Insecticide with Acaracidal Activity**

MR GERT VOLPP, MR. N.A. SLADEN, MR BING CHEN

FMC Corporation, P.O.BOX 8, Princeton, New Jersey, USA

Bifenthrin is a member of a group of broad-spectrum pyrethroids which have demonstrated excellent performance as foliar insecticides against insects of the orders Lepidoptera, Coleoptera, Hemiptera, Diptera and Orthoptera, along with significant acaricidal activity.

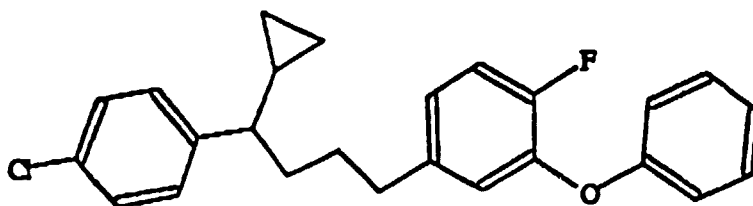


Bifenthrin

22. **F7869 - A Highly Efficacious Insecticide with Low Fish Toxicity;** MR. GERT VOLPP, MR. N.A.SLADEN,

MR. BING CHEN, FMC Corporation, P.O.Box 8, Princeton, New Jersey, USA

Studies directed toward the discovery of fish safe, non-ester pyrethroids have resulted in the identification of F7869 as a potent insecticide for use in rice culture. Important rice pests are effectively controlled by F7869 and this highly lipophilic molecule is very safe in tests with bluegill and carp. The cyclopropyl group is a critical feature, replacement by an isopropyl group results in dramatic loss of biological activity.



F7869