

<b>Project Name Code: 2.10</b>	<b>Training workshop on improved production and application of biopesticides</b>
<b>Australian Personnel</b>	Dr Caroline Hauxwell
<b>Australian Institution</b>	Department of Primary Industries Queensland
<b>Vietnam Institution</b>	National Institute for Plant Protection (NIPP)
<b>Project Duration</b>	July 2001 to June 2003

## **Project Description**

The project builds on recommendations on delivery of biocontrol options to Vietnam identified by CABI and UNEP (Jenkins and Vos, 2000. Delivery of Biocontrol Technologies to IPM Farmers: Vietnam. UNEP/CABI Critical Issues Case Studies. CAB International/UNEP publication).

The activities will consist of a workshop on biopesticide selection and identification, biopesticide production and product quality control, and on application and integration into farming systems. Vietnamese participants will be invited from the National Institute of Plant Protection and from other organisations within Vietnam, including the Vietnam National IPM program, the FAO Program for Community IPM in Asia, and the regional Sweetpotato IPM Project of the International Potato Centre. Participation by staff from Natural Resources International (NRI) and Commonwealth Agriculture Bureau International (CABI) is expected, with support from the UK Department for International Development (DFID). Research protocols will be reviewed, improved protocols will be produced and further research needs will be identified. A strategy to address the future research needs will be developed. Workshop proceedings, protocols and research strategy will constitute the outputs from the project.

Major inputs will consist of transport and accommodation for participants from Vietnam and Australia (\$27,695), workshop facilities, catering, shipping and publishing costs (\$17,620), salaries (\$24,932) and minor capital items and consumables to implement improved research protocols (\$11,075). The total requested is \$82,323, with an additional combined contribution of \$67,766 from QDPI and NIPP.

## **Objectives**

The objectives of the project is to improve the capacity for research and implementation of biopesticide technology of the BCRC of the NIPP through improved selection, production, application and integration of biopesticides. This supports the objectives of the Vietnam National IPM program and follows recommendations from the UNEP/CABI report (Jenkins and Vos, 2000). Participation and support will be sought from the FAO Program for Community IPM in Asia and the regional Sweetpotato IPM Project of the International Potato Centre.

Research needs will be identified and used to develop a program of research and training between Vietnam, Australia and UK to address these needs. Plans and protocols will be produced by the end of the project, which will be verified from the plans and protocols themselves and from the final report to AusAID. The aim is an immediate improvement in the research capacity of the Vietnamese institution and identification of further productive programs between both Vietnamese, Australian and UK partners.

The program will directly address the aims of the CARD program to enhance Vietnam's capacity for research and training in agriculture by improvement in the research techniques and facilities of the participating institutions and identification of future strategies to further improve capacity for research. This is primarily in the field of crop production.

## Outputs and Performance indicators

Outputs	Performance Indicators
<ul style="list-style-type: none"> <li>◆ A workshop on biopesticide selection and identification, production and product quality control and application and integration into farming systems will be conducted. Research protocols will be reviewed and improved protocols will be produced. Further research needs will be identified. A strategy to address the future research needs will be developed.</li> </ul>	i) The verifiable indicator for these outputs will be that the workshop will have been conducted and the proceedings, protocols and research plans will have been produced. This will be verified from reports to AusAID, proceedings, protocol and research-plan documents
<ul style="list-style-type: none"> <li>◆ Workshop proceedings, protocols and research strategy will be produced and disseminated.</li> </ul>	

Project Name	Training workshop on improved production and application of biopesticides.
Australian Organisation	Queensland Department of Primary Industries, Farming Systems Institute
Australian Personnel	Dr. Caroline Hauxwell, Dr. David Murray, Dr. David Holdom, Ms. Julie Fergusson
Date commenced	3 <sup>rd</sup> September 2001
Completion date	20 <sup>th</sup> December 2001
Reporting period	Final report

## PROJECT COMPLETION REPORT

### Executive summary

Biopesticides based on insect-specific pathogens have been developed as 'safe' alternatives to chemical insecticides, with little observed effects on natural enemies, limited capacity for the development of resistance and no adverse effects on vertebrates or accumulation in the food chain. Australia is a world leader in the use of this technology within a program of integrated pest management (IPM).

Information available on research, production and integration of biopesticide into farming systems in Vietnam is very limited. Jenkins and Vos (2000) reported that: "The Vietnam National IPM program provides a strong base for the uptake of biopesticide products, [however] farmer participatory training in the testing and use of biopesticides has been limited due to the lack of availability of products." They also recognised that mass production technology and formulation were critical to improving availability. Further issues identified by workers in Vietnam during preparation of the workshop include lack of communication and cooperation between institutes.

The workshop aimed to identify key areas of research in Vietnam, with an immediate improvement in the research capacity of the National Institute for Plant Protection (NIPP), to improve communication between participating institutions, and to identify research priorities and develop a plan for improving production and integration of biopesticides into farming systems.

The workshop **was completed** over two weeks between the 12<sup>th</sup> and 23<sup>rd</sup> of November 2001 at the National Institute for Plant Protection in Hanoi. The first week addressed IPM and integration of biopesticides into farming systems, during which key issues and requirements regarding biopesticides were identified. The second week addressed biopesticides production and quality control. The large numbers of participants (around 40) and the diversity of organisations represented changed the nature of the workshop, particularly in the second week, from the anticipated focus on specific research within NIPP to a broader range of research across institutions.

**The broad aims of the project were achieved.** The workshop provided greater insights into the needs, priorities and opportunities for development of biopesticides in Vietnam than was originally anticipated.

- Workshop processes identified key research and development priorities.
- Protocols and means for improving research were discussed in detail and improved technical protocols were distributed.
- Participants identified resources and expertise already available in other institutions, and identified key areas of change for immediate implementation in their organisations.
- There was significant sharing of information and identification of available resources between researchers from different organisations in Vietnam.
- Feedback from observers and participants described an unprecedented degree of cooperation and interaction between staff of different Vietnamese organisations.
- The participatory workshop process took advantage of the large number of participants and organisations to establish authentic research priorities, but the numbers limited possibilities for planning. Thus a plan of future research needs was not completed during the workshop, but suggestions for further research and development are being developed using priorities and expertise identified during the workshop.
- A lengthy workshop publication was not originally envisaged, but the breadth of information explored was such that an extended compilation of notes and materials is being prepared, and has recently been typed for editing.

## **1 Project description**

The workshop aimed to identify the key areas of research in Vietnam, with an immediate improvement in the research capacity of the Vietnamese institution, to improve communication between participating institutions, and to identify priorities and develop a research plan for improving production and integration of biopesticides into farming systems.

The workshop was conducted over two weeks between the 12<sup>th</sup> and 23<sup>rd</sup> of November 2001 at the National Institute for Plant Protection in Hanoi. The first week addressed IPM and integration of biopesticides into farming systems, during which key issues and requirements regarding biopesticides were identified. The second week addressed biopesticides production and quality control and addressed protocols used by participating organisations.

## **2 Appropriateness of project design and objectives**

Information available on research, production and integration of biopesticide into farming systems in Vietnam is very limited. Jenkins and Vos (2000) reported that: “The Vietnam National IPM program provides a strong base for the uptake of biopesticide products, [however] farmer participatory training in the testing and use of biopesticides has been limited due to the lack of availability of products.” They also recognised that mass production technology and formulation were critical to improving availability. Further issues identified by workers in Vietnam during preparation of the workshop include lack of communication and cooperation between institutes.

A workshop was determined to be the most cost-effective means of initially addressing these issues, although the National Institute for Plant Protection (NIPP) originally proposed a larger, 3-year research and development project. The workshop aims were to identify the key areas of research in Vietnam, with an immediate improvement in the research capacity of the NIPP, to improve communication between participating institutions, and to identify priorities and develop a research plan for improving production and integration of biopesticides into farming systems.

QDPI and NIPP developed themes for each week prior to the workshop. The first week addressed IPM and integration of biopesticides into farming systems, during which key issues and requirements regarding biopesticides were identified. The second week addressed biopesticides production and quality control.

The order of the two weeks was reversed from that in the proposal. Key priorities and requirements for implementation of biopesticides in farming systems were established in week 1 and provided a context for technical solutions to specific problems (such as product availability and quality), addressed in week 2. It had been anticipated that the week on production and quality control would focus on specific research within the NIPP. However the diversity of organisations represented changed the workshop in the second week to address activities across several institutions.

The first two days of each week consisted of visits to projects and research groups in the Ha Noi region, followed by three days of workshop sessions in which a flexible, participatory approach was followed. Each day began with formal presentations of up to 2 hours during which themes for the day, key issues and research methods were described. This was then followed by impromptu 10-minute presentations from participants on related subjects. The afternoons consisted of work-group discussions among participants, reporting-back and exercises such as identification of priorities or outcomes, or of detailed discussion/training in key techniques such as bioassay.

Workshop processes identified key research and development priorities. Protocols and means for improving research were discussed in detail and improved technical protocols were distributed. There was significant sharing of information and identification of available resources between researchers from different organisations in Vietnam. Participants identified resources and expertise already available in other institutions, and identified key areas of change for immediate implementation in their organisations.

The participatory workshop process took advantage of the large number of participants and organisations to establish authentic research priorities, but the numbers limited possibilities for planning. A lengthy workshop publication was not originally envisaged, but the breadth of information explored was such that an extended an extended compilation of notes and materials is being prepared. Typing of this material has recently been completed.

A participatory approach was used in order to increase communication between Vietnamese participants. The participatory format of the workshop was challenging for the NIPP and some Vietnamese participants, who were more comfortable with a 'conference' style of presentations. However, participants

were very active and enthusiastic and the format was successful in achieving aims, particularly with a larger group than had been anticipated. Feedback from observers and participants described an unprecedented degree of cooperation and interaction between staff of different Vietnamese organisations.

Objective	Description	Appropriateness
Conduct a workshop on biopesticide selection and identification, production and product quality control and application and integration into farming systems.	Review and improve research protocols, identify further research needs, develop a strategy to address research needs.	5
Produced and disseminate workshop proceedings, protocols and research plans.		4

Description of design features	Appropriateness
A participatory workshop.	5

### 3 Likely achievement of project objectives

The objectives were achieved. The workshop was completed between the 12<sup>th</sup> and 23<sup>rd</sup> of November 2001 at the National Institute for Plant Protection in Hanoi. The workshop aimed to identify the key areas of research in Vietnam, with an immediate improvement in the research capacity of the Vietnamese institution, improve communication between participating institutions and identify priorities and develop a research plan for improving production and integration of biopesticides into farming systems. These aims were largely achieved. Limits were encountered in planning future research, in purchasing and shipping equipment and in preparing workshop proceedings (described below).

- Workshop processes identified key research and development priorities. Protocols and means for improving research were discussed in detail and improved technical protocols were distributed during the workshop. Participants identified key areas of change for immediate implementation in their organisations.
- Communication between researchers in organisations increased beyond expectations. Participants identified resources and expertise already available in other institutions. Feedback from observers and participants described an unprecedented degree of cooperation and interaction between staff of different Vietnamese organisations.
- The participatory workshop process took advantage of the large number of participants and organisations to establish authentic research priorities, but the numbers limited possibilities for planning. Thus a plan of future research needs was not completed during the workshop, but suggestions for further research and development are being developed using priorities and expertise identified during the workshop.
- A lengthy workshop publication was not originally envisaged, but the breadth of information explored was such that an extended an extended compilation of notes and materials is being prepared, and have recently been typed.

	Objective	Achievement rating
1	Conduct workshop	5
2	Produce proceedings, protocols and research plans.	3

### 3.1 Implementation performance

The workshop was conducted as planned and exceeded expectations. Performance rating 5.

Most outputs (protocols, priorities etc) were identified/met during the workshop, but preparation of an extended compilation of notes and materials and a research strategy are delayed (see above). Performance rating 3.

The project overall is within budget.

	Component description	Performance rating
1	Conduct workshop	5
2	Produce proceedings, protocols and research plans.	3

## 4 Management performance

Management of the Australian agency was satisfactory in most respect. The workshop was conducted on time with the correct personnel. Networking by Australian staff contributed significantly to the number of organisations participating and to the design of the workshop. The project is within budget. Financial records are accurate. Reporting has been unacceptably delayed due to unforeseen workloads on the project leader. Rating 3 or 4.

The Vietnamese partner agency provided appropriate workshop facilities as planned, and had organised a series of highly appropriate and informative visits. The format of the workshop had not been fully adopted by senior officials and required revision, which was rapidly facilitated by the organising staff. Administrative support throughout the workshop was excellent. A financial statement was prepared and was within budget. Specific receipts were not requested. Biopesticide research and production facilities were very limited. Rating 3 or 4.

## 5 Sustainability

The sustainability of the project was 3 or 4 (fully satisfactory to satisfactory overall).

Financial: The workshop was a highly economical means of conducting a review and improving biopesticides research and communication.

Institutional: Communication and cooperation between institutions is a significant problem. The workshop was able to address this in part by creating a cooperative working environment and increasing communication between participants, and by exploring resources and expertise available in a wide number of organisations. The lead role of the Plant Protection Department in incorporation of biopesticides through the national IPM program was clear. Future research within organisations such as NIPP and the Universities should support these aims.

Technical: Facilities for production and quality control for biopesticides in Vietnam require significant technical input. The project addressed immediate needs through discussion and dissemination of protocols, and through identification of resources in a number of organisations. At the end of the workshop, participants identified specific areas of change for immediate implementation in their work. Specialised training is needed in production and quality control and in integration of biopesticides in IPM.

Environmental: The aims of the research supported by this project are highly desirable, leading to sustainable agriculture and reduced environmental contamination with chemical insecticides.

Social/community: The aims of the research supported by this project are highly desirable, leading to sustainable agriculture and reduced human exposure to chemical insecticides.

Gender: The gender balance of the workshop showed a predominance of women. A representative of the national women's farmers union was present throughout the workshop.

### **5.1 Constraints, issues and risks**

A plan of specific research and training was not completed during the workshop but suggestions for further research and development are being developed using priorities and information on expertise identified during the workshop. The breadth of information explored was such that workshop an extended compilation of notes and materials is being prepared, and have recently been typed.

Support from the UK Department for International Development (DFID) was not forthcoming, which prevented participation by staff from Natural Resources International (NRI) and Commonwealth Agriculture Bureau International (CABI). This did not have a measurable impact on the workshop as issues addressed were well within the expertise of Australian participants.

Purchase of equipment was delayed until after the workshop so that equipment could be aligned to research protocols identified during the workshop. Equipment priorities differ from those outlined in the proposal, however difficulties and delays in identifying suppliers in Australia who would ship to Vietnam prevented purchasing equipment, and this was not completed within the project time frame.

## **6 Outputs achieved**

Identify the key areas of research in Vietnam, with an immediate improvement in the research capacity of the Vietnamese institution: Workshop processes identified key research and development priorities. Protocols and means for improving research were discussed in detail and improved technical protocols were distributed during the workshop. Participants identified resources and expertise already available in other institutions, and changes for immediate implementation in their work. The large numbers of participants (around 40) and the diversity of organisations represented changed the workshop in the second week from the anticipated focus on research within the NIPP to a broad range of activities across institutions.

Improve communication between participating institutions: The workshop was highly successful in attracting a large representation of researchers and organisations involved in biopesticides research. The majority of participants stayed for both weeks. Participants were very active and enthusiastic. There was significant sharing of information and identification of available resources between researchers from different organisations in Vietnam. Participants identified resources and expertise already available in other institutions. Feedback from observers and participants described an unprecedented degree of cooperation and interaction between staff of different Vietnamese organisations.

Identify priorities and develop a research plan for improving production and integration of biopesticides into farming systems: The participatory workshop process took advantage of the large number of participants and organisations to establish authentic research priorities, but the large numbers limited possibilities for planning. Thus a plan of future research needs was not completed during the workshop, but suggestions for further research and development using workshop outputs have been discussed with FAO representatives in Vietnam.

Output.	Achieved - actual
1. Conduct workshop	100%
2. Produce proceedings, protocols and research plans.	60%

## **6.1 Recommendations for variation of project design**

None.

## **6.2 Evaluation of project performance and outcomes**

Achievements: The workshop itself achieved more than was originally anticipated. The broad range of participants and the active participatory process permitted an authentic examination of issues and organisations and establishment of relevant research priorities. This in turn allowed specific protocols to be discussed and disseminated at the workshop. Comments from participants and observers stated that the level of disclosure and communication between participants was unprecedented in Vietnam. Thus the aims of improving research capacity, establishment of research priorities, and improved communication were all achieved.

The large numbers of participating organisations limited possibilities for planning future research, thus a plan of future research needs was not completed during the workshop. Suggestions for further research and development are being developed using priorities and expertise identified during the workshop.

Purchase and shipping of equipment was not completed in time. Purchase of equipment was delayed until after the workshop so that equipment could be aligned to research needs identified during the workshop. Materials identified differed from that outlined in the proposal, but within the original budget. However, difficulties and delays in identifying ways of shipping meant that this could not be completed within the project time frame.

General comments on issues for consideration with respect to continuation of CARD: Communication and cooperation between institutions requires significant support. The lead role of the Plant Protection Department in incorporation of biopesticides into farming systems was clear, and research within organisations such as NIPP and the Universities should support this. Future projects must seek to limit competition and duplication between organisations, and to assign resources and roles appropriately.

Facilities for production and quality control for biopesticides in Vietnam require significant technical input. Specialised training is needed in production and quality control of the main groups of biopesticides and in integration of biopesticides in IPM. Significant investment in production facilities is needed through an appropriate state or private organisation, but not through organisations primarily conducting research (Universities or state institutes). Specific supporting research needs should be addressed in collaboration with research organisations.

## **7 Conclusion**

Biopesticides have significant benefits within integrated pest management in control of key pests such as diamond back moth and *Heliothis*. Product quality and availability are key limiting factors in Vietnam. The background expertise and facilities for research and integration of biopesticides into farming systems are in place in Vietnam, however significant technical and financial inputs are required. Future projects must seek to limit competition and duplication between organisations, and to assign resources and roles appropriately.