



**Australian Government**

**Australian Centre for  
International Agricultural Research**

# Final report

Small research and development activity

SRA

## Establishment of fruit fly pest-free areas

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*prepared by*

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## 1 Acknowledgments

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- Mr Richard Walker, Manager, Plant Biosecurity & Risk Management and Chief Plant Protection Officer, Biosecurity, Compliance & Mine Safety. NSW Department of Primary Industries for his stalwart role in the SRA
- Dr Andrew Tomkins , Principal Officer, Victoria, Department of Primary Industries
- Mr Glenn J.Bowman, Plant Scientist, Biosecurity Australia.
- Dr Catherine Smallridge, Entomologist, South Australia Research and Development Institute (SARDI),
- Dr Tong Kwee Lim, Program Manager at ACIAR, who facilitated and provided advice on the project preparation and activities.

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## 2 Executive summary

Tephritid fruit flies are major horticultural insect pests in Indonesia, with 8 major pest species that cause enormous crop losses of most edible fruits and fruiting vegetables in Indonesia. Of greater economic impact are the associated quarantine requirements on international trade and the costs to national quarantine agencies in the applications of fruit fly quarantine surveys necessary to detect new incursions of major exotic pest species and the need for costly disinfestation treatments.

The Ministry of Agriculture in Indonesia has placed high priority on the establishment of applied research projects and training that will lead to the development of solutions to their fruit fly problem and expand export of horticultural commodities from Indonesia. Consequently, the Ministry of Agriculture in collaboration with Griffith University is currently conducting a 4.5 year ACIAR funded project entitled “Managing pest fruit flies to enhance quarantine services and upgrade fruit and vegetable production in Indonesia – CP/2003/036.

To respond to the recent request from the Directors-General of the Indonesian Quarantine Agency and The Horticulture Directorate for assistance into the feasibility and practicality of setting up pest-free areas for fruit flies, a workshop on fruit fly pest-free Areas was convened in Indonesia from 19-22 June, 2007 in Jakarta. The Australian model of pest-free areas for fruit flies around the Murray River area covering 3 states has been touted as an exemplary case that has complied to WTO ISPM standards (ISPM No. 04 (1995) “Requirements for the establishment of pest-free areas” and ISPM No. 26 (2006) “Establishment of pest-free areas for fruit flies (Tephritidae)” and have helped Australia to access many overseas markets. The purpose of the workshop was to acquaint Indonesian quarantine and crop protection staff on the establishment of pest-free areas for fruit flies, to provide information and a platform for discussion on what a fruit fly free area is, how it is maintained, the complexities of resources required and what it costs to implement the program.

## Objectives

The specific objectives of the workshop were to:

1. Improve access to relevant, up-to-date information on the feasibility and practicality of the establishment and maintenance of pest-free area freedom for fruit fly and the requirements for establishment of areas of low pest prevalence and pest-free places of production and pest-free production sites.
2. Assist in the development of national policies and regulatory frameworks relating to the above ISPMs for market access purposes using the Australian Tri-state Fruit Fly pest-free exclusion Zone model.
3. Support capacity building in biosecurity issues and decision-making to address the above issues.

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## 3 Introduction

Fruit Flies of the Family *Tephritidae* are recognised worldwide as the major pests of horticultural production at both the commercial and subsistence levels, and from cold temperate regions of the globe to the heart of the tropics. Crop losses range from 40% to 100%, depending on the particular crop. In addition to the major crop losses inflicted by fruit fly infestations in most fruit and many vegetable crops, the presence of fruit flies in a country has major quarantine implications:

- strict quarantine restrictions to trade are applied by importing market countries.
- costly Market Access Technologies are required in order to meet the marketing constraints
- permanent quarantine surveys must be established in production areas in order to guarantee importing countries that the fruit fly pest species are known in the locations from which crops are exported
- quarantine surveys must be established in key locations such as ports of entry, to detect new incursions of exotic fruit fly pest species

Fruits and vegetables provide only about 2 percent of the total dietary energy in Indonesia (Singh 1988), and this needs to be increased markedly in order to assist in the alleviation of dietary induced health problems. Singh (1988) reported that the annual production per caput of fruits in South East Asia was only 25 percent of that of the rest of the world and that fruit fly pests were a major cause of this. The Directorate of Horticulture Production, Jakarta, has reported that in spite of the application of chemical controls and other methods against fruit flies, results are below expectation and that fruit production is so unreliable that importing countries turn to more reliable producer countries for supply.

The major crops that are susceptible to fruit fly attack and which are being grown for the Indonesian domestic market and their locations of production, are as follows –

- Mango – East Java, West Java
- Banana – Lampung, West Java, Central Java, East Java, West Sumatera, Jambi, South Sulawesi, North Sumatera
- Citrus – East Java, West Java, North Sumatera, Bali, East Nusa Tenggara, South Kalimantan, West Kalimantan, South Sulawesi
- Jack fruit – West Java, Central Java, East Java, Lampung, South Sumatera, South Kalimantan, East Kalimantan
- Carambola – Jakarta, West Java, Central Java

- Passionfruit – North Sumatera, South Sulawesi
- Guava – Jakarta, West Java, Central Java, North Sumatera
- Melon – Aceh, East Java, Central Java
- Papaya – East Java, Central Java, Aceh
- Chili – West Java, East Java, North Sumatera, Aceh, Bali, West Kalimantan

Data provided by the Indonesian Ministry of Agriculture for 2001 show that Indonesia produces approximately 12 million tons of fresh fruit annually from approximately 661,649 Ha. Based on the fresh commodity export volume and value provided by the Ministry of Agriculture in Jakarta, the average value of production is \$2 per kg. Using this figure, the value of Indonesia's fresh fruit production (12 million tonnes) would be approximately \$2.4 billion. From the above data, the cost of the fruit fly problem to Indonesia can be summarised as follows

Crop losses, using the lower level of 40%, would be valued at approximately \$1.6 billion. Cost of field pest management using pesticide cover sprays is estimated as 10% of the crop value. This would cost some \$240 million per annum, if applied to the entire crop. Indonesia exports less than it imports to the value of \$37 million. Consequently there is a considerable negative balance of payments in fresh fruit trade that the government of Indonesia would like to address by significantly increasing the exports of fresh fruits.

To help protect fruit-growing regions in South Australia, northern Victoria and southern New South Wales, growers, industry and governments from the three states joined forces in 1994 to establish a Fruit Fly Exclusion Zone (FFEZ). Today, growers within the Zone can access lucrative export markets that growers outside the Zone cannot because they can't claim their produce is grown in a fruit fly free area. Market access for citrus has thus been gained to China, Korea, Japan, Thailand, United States of America, Taiwan and the South Pacific region.

Apart from area freedom, Biosecurity Australia and AQIS have also developed a series of management protocols that cumulatively achieve the desired level of phytosanitary protection to enable export of tomato to the USA and New Zealand. Such an approach will also be relevant to fruits and vegetables targeted for export in Indonesia. Under Australia's bilateral agreement with New Zealand, five varieties of tomatoes are permitted entry into New Zealand by use of a dimethoate dip/spray treatment that targets Queensland fruit fly. AQIS recently provided to MAF information on a proposed management strategy for access of all varieties of Australian tomatoes into New Zealand. The proposed management strategy was prepared in accordance with the draft FAO International Standard for Phytosanitary Measures (ISPM) : Integrated Measures for Pest Risk Management (Systems Approach), and is designed to manage the risk of Queensland fruit fly entering New Zealand via this pathway. The proposed management strategy is for export fruit produced on a commercial basis only.

The effectiveness of the existing protocol has been suitably demonstrated in that no Queensland fruit fly eggs or larvae have been detected in Australian tomatoes at the New Zealand border during the past twelve years. The proposed management strategy for all tomato varieties is designed to be equally as effective, and to provide equivalence to the existing protocol by using a number of pre- and post-harvest measures. This (systems) approach is defined in the draft ISPM as... "the integration of different pest risk management measures, at least two of which act independently, and which cumulatively achieve the desired level of phytosanitary protection".

Recent work by Biosecurity Australia and AQIS has also resulted in formal US-recognition of (i) an extension of the fruit fly free areas within the Riverland horticultural district in

Victoria and South Australia and (ii) market access for Australian glasshouse tomatoes to the US. APHIS has released a final version of the amended text for the 11<sup>th</sup> periodic amendment of the US Code of Federal Register, which confirms market access for Australian glasshouse tomatoes to the US. Glasshouse tomato producers will be able to export fruit to the US, provided they comply with production methods specified by APHIS, such as fruit fly trapping grids around the glasshouses and specified air-vent characteristics within the glasshouse. A work plan will be developed by AQIS, in conjunction with Biosecurity Australia, State departments and industry for glasshouse tomatoes to meet the US Code of Federal Register ruling.

### 3.1 Communication and dissemination activities

The workshop was declared open by the Director-General of the Directorate of Horticulture production, Dr. Ahmad Dimiyati, and was attended by 25 participants who were mostly senior scientists or administrators involved in crop protection from various agencies in Indonesia. Also attending as observers were another 3 participants from the Regional Office of the International Centre for Management of Pest Fruit Flies in Malaysia, and 2 from the CAB International South East Asia Regional Office, both located in Malaysia. The workshop was conducted over 4 days and the program addressed the various aspects of work that are required for the establishment and maintenance of a pest-free Area based on the Australian experience. A field trip was also made to a mango production area in the province of Indramayu. A summary of the topics covered by the various resource staff from Australia is provided below:

Speaker	Topic
<p><b>Dr. S. Vijaysegaran</b> Deputy Director International Centre for the Management of Pest Fruit Flies, Griffith University, Nathan Campus, Brisbane 4111, Australia.</p>	<p><b>'Fruit Fly Species of Indonesia: Host Range and Distribution'</b> The total number of species in Indonesia is 37 with <i>Bactrocera papayae</i> and <i>B. carambolae</i> identified as the most virulent and dangerous because of their wide host range, the same situation as in other countries in S.E. Asia. Another 6 were identified as economic species but have a narrower host range.</p>
<p><b>Mr. Glenn J. Bowman</b> Plant Scientist Biosecurity Australia, Edmund Barton Building, Barton, ACT, GPO Box 858, Canberra, ACT 2601, Australia</p>	<p><b>'Concept/Principles of Area Freedom'</b> Presented an overview of documents on WTO, SPS, IPPC and CPM culminating in the establishment of two International Standards for Phytosanitary Measures (ISPM), i.e. ISPM No. 02 (Requirements for the establishment of pest-free Areas) and No. 26 (Establishment of pest-free areas for fruit flies (Tephritidae). These 2 ISPMs spell out the fundamental requirements for establishing pest-free Areas in relation to fruit flies.</p>
<p><b>Dr. Catherine Smallridge</b> Entomologist, South Australia Research and Development Institute (SARDI), Waite Road, Urrbrae, SA 5064, GPO Box 397, Adelaide, SA 5001 Australia</p>	<p><b>'Managing a pest-free area for Queensland Fruit fly- The Australian experience'</b> Introduced the 30 million ha area around the Murray River covering 3 states: South Australia, New South Wales and Victoria, hence known as the Tri-State Fruit Fly Exclusion Zone (FFEZ). This area is protected by a wide buffer beyond which is the semi-arid area in the north west, sea in the south and mountain ridge on the north-east. The low rainfall &lt;500 mm annually and the cool winter temperatures 3-6<sup>o</sup>C are very favourable for exclusion of fruit flies.</p>

Speaker	Topic
<p><b>Dr. Andrew Tomkins</b> Principal Officer, Department of Primary Industries, Private Bag 1, Ferguson Road, Tatura, Victoria 3616</p>	<p><b>‘Eradication Procedures for Reinstatement of Fruit Fly Pest-free status and Costs of operating the Fruit Fly Exclusion Zone (FFEZ)’</b></p> <p>Incursions of fruit fly into the FFEZ are mainly through introduction of infected fruits by people. Hence previous reported outbreaks have been restricted to urban and not farm production areas. An outbreak is declared when 5 or more male flies are found in traps or one larva is found in fruits or one gravid (fertile) female is caught. A suspension of pest-free status over 15 km radius of the point of outbreak is then imposed. Actions in eradication include use of supplementary traps, protein bait program over 12 weeks, protein bait program (2 weeks) coupled with release of sterile flies followed by larval search in fruits and detection of flies in traps. Reinstatement of pest-free status is dependent on the absence of fruit flies or larvae with the suspension area after 12 weeks from outbreak.</p> <p>The annual budget for operating the FFEZ is around AUD 7-8 million annually. The biggest cost is in eradication of incursions (40%), followed by operations and monitoring (30%), roadblocks to check fruit introductions (15%) and inspection, awareness programmes and R&amp;D making up the rest of the costs. The cost in establishment of the FFEZ may run up to several times the operating annual costs (maybe AUD 35 million).</p> <p>The cost of maintaining the FFEZ are extremely high, but it was felt that it opened up quarantine-stringent markets, produced safer produce, saved chemical costs and is more environmental friendly, thus it is considered a cost-effective programme</p>



Speaker	Topic
<p><b>Mr. Richard Walker</b>            Manager, Plant Biosecurity &amp; Risk Management and Chief Plant Protection Officer, Biosecurity, Compliance &amp; Mine Safety. NSW Department of Primary Industries, 161 Kite Street, Orange NSW 2800, Australia</p>	<p><b>‘ pest-free Area Validation, and Action following detection of fruit fly incursions’</b></p> <p>Application for market access using PFA must be first applied at the importing country. Records of pest list, trappings (type of traps, grid layout, inspection frequency, trap maintenance and proof of pest-freedom are required before validation of PFA. This can take 6-10 years. Inspectors from importing countries may visit the production to audit from time to time.</p> <p>When an outbreak (5 males or 1 larva or 1 fertile female are found in traps) occurs, the interested parties are notified and the suspension area defined. The eradication process follows as mentioned above.</p> <p>Products from the suspension area cannot be moved to markets without postharvest treatments. These treatments include dimethoate or fenthion dips, cold treatments, hot water dips, forced hot air, methyl bromide fumigation and vapour heat treatment. Also produce from suspension areas must be segregated from those in other areas of the FFEZ and cannot be sold in quarantine sensitive markets. Only upon reinstatement of PFA status can they resume sales in those markets.</p> <p><b>‘Risk Management Components, Surveillance and Reporting’</b></p> <p>There is an ongoing risk of introducing fruit flies through movement of people and goods. Measures can be applied which reduce the opportunity for these introductions including controls on the movement of susceptible produce into the zone (roadblocks, fines) and public relation campaigns which highlight the risk associated with the movement of infested produce by the public.</p> <p>The surveillance and reporting is governed by ISPM No.6 (Guidelines for surveillance’) and ISPM No. 8 (Determination of pest status in an area). The Code of Practice for Management of Queensland Fruit Fly is always consulted in this PFA programme. In the reporting system, the ‘PestMon’ data management coupled with bar coding on the traps for traceability is an effective tool and is currently used in the 3 states.</p>

Following the various presentations, the participants were divided into 2 discussion groups to deliberate upon the feasibility of establishing a Fruit Fly pest-free Area in Indonesia. The discussion groups produced a list of important considerations in relation to the establishment and maintenance of Fruit Fly pest-free Areas in Indonesia. These are:

- Trapping versus fruit sampling for initial pest-free Area validation
- Capacity to deal with a range of fruit fly species simultaneously, both during validation and ongoing eradication
- Unfavourable conditions for fruit fly in Australia compared to Indonesia – making it much easier to achieve in the Australian context
- Use of Sterile Insect Technology in Indonesia – is it feasible and economically justifiable?



- The importance of awareness programs in Indonesia to get messages across a wide cross section of interests
- Costs of operating a PFA were likely to be prohibitive for Indonesia
- Social & cultural differences would present significant challenges
- Natural buffers were non-existent in Indonesia except for perhaps relocating horticultural production to an island situation.

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### 3.2 Farmer-level, community or policy impacts (economic, social and/or environmental)

The benefits to the Indonesians of the workshop were seen to be:

- Improved access to relevant, up-to-date information on the feasibility and practicality of the establishment and maintenance of pest-free area freedom for fruit fly in Indonesia
- Improved ability of senior Indonesian Plant Quarantine and Crop Protection staff to develop national policies and regulatory frameworks relating to the ISPMs for market access purposes using the Australian Tri-state Fruit Fly pest-free exclusion Zone model.
- Enhanced capacity of Indonesian Plant Quarantine and Crop Protection staff in biosecurity procedures and decision-making.

The benefit to Australia was seen to be the educating of the Indonesians on the management of the Tri-State Fruit Fly Exclusion Zone pest-free Area that may facilitate market access.

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### 3.3 Intellectual property

All materials produced are considered global public goods and are freely available.

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## 4 Relationship to other activities

ACIAR and AusAID have supported a number of research and development projects of fruit flies in Asia and the Pacific:

- CS2/83/43 – Fruit Flies in Malaysia
- CS2/89/19 – Biology and Control of Fruit Flies in Thailand and Malaysia
- CS2/89/20 – The identification and control of pest fruit flies of the South Pacific
- CS2/94/03 – Identification of pest fruit flies in Vanuatu, Solomon Islands and Federated States of Micronesia
- CS2/96/225 – Identification, biology, management and quarantine systems for fruit flies in Papua New Guinea
- CS2/1997/101 – Pest management of *Bactrocera minax* (the Chinese citrus fruit fly) in Bhutan
- AusAID (CARD) – Field control of pest fruit flies in Vietnam
- CS2/1998/005 – Managing pest fruit flies to increase production of fruit & vegetable crops in Vietnam

- CP/2003/036 – Managing pest fruit flies to enhance quarantine services and upgrade fruit and vegetable production in Indonesia

In addition to the above research projects, AusAID has also supported regional programs in S.E. Asia conducted by federal DAFF staff aimed primarily at improving the capacity of plant health scientists in recipient countries to diagnose pests and diseases of agriculture, to preserve specimens and to maintain pest and disease databases and collections.

These programs are:

- AusAID (APEC Support Program, 2003) – Standards and priorities for developing pest lists in countries of South East Asia
- AusAID (Indonesia – Australia Government Sector Linkages Program, 2001-4) – Development of a database and upgrading of associated reference specimens of agriculturally important insects.

Apart from the above projects, a total of at least 20 workshops have been conducted. The Crawford Fund has also collaborated in this. The establishment of pest-free areas for fruit flies is a pest risk management option that may be used to comply with the phytosanitary requirements of importing countries. However, no research projects on establishment of pest-free areas for fruit flies have so far been conducted in the region by either ACIAR or AusAID.

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## 5 Budget

Year 1 (2006/2007) Pay 1	Year 2 (2007/2008) Pay 2	Total
\$46,910	\$3,000	\$49,910

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## 6 Conclusions and recommendations

Faced with the above considerations, the workshop came up with the following conclusions for follow-up action by the Ministry of Agriculture:

1. Indonesia needs to formulate a National Fruit Fly Strategic Plan
2. Need to form a Market Access Working Group
3. Need a stock-take of in-country knowledge & resources
4. Need to form a PFA Scientific Advisory Panel immediately.

Feed-back from the workshop participants indicated that it was well run, the speakers presented competently and that it was a very worthwhile capacity building exercise. The Indonesians indicated that following further consideration, they would need to consult further with Australia on possible alternatives to pest-free areas.

## 7 Appendixes

### 7.1 Appendix 1: Workshop Photographs



Delegates at Santika Hotel, Jakarta



Opening of Workshop





Delegates on Field Trip to Indramayu, Central Java



Discussion with mango growers in Indramayu





## 7.2 Appendix 2: Workshop Program

### 7.2.1 FRUIT FLY PEST-FREE AREA WORKSHOP

19 – 22 June 2007

Hotel Santika, Jakarta, Indonesia

#### **DAY 1 – Tuesday 19 June 2007**

*TOPIC 1: Fruit Fly Species of Indonesia/host range and distribution*

Speaker: S. Vijaysegaran – Griffith University 9.30 – 10.30

MORNING TEA 10.30 – 11.00

*TOPIC 2 Concept/Principles of Area Freedom*

- ISPM No. 04 (1995) “Requirements for the establishment of pest-free Areas”
- ISPM No. 26 (2006) “Establishment of pest-free areas for fruit flies (Tephritidae)”

Speaker – Glenn Bowman - Biosecurity Australia 11.00 – 12.00

LUNCH 12.00 – 1.00

*TOPIC 3: Managing a pest-free area for Queensland fruit fly - pest-free area validation*

Initial establishment of pest-freedom and clearly demonstrate pest-freedom. Subsequent continual confirmation (by trap monitoring) that freedom is maintained.

1. Definition of a regulated pest-free area
2. Validation of pest-free area
3. Trapping - type of traps, layout of grid, trap location, inspection frequency and trap maintenance
4. Records
5. Identifications
6. Control & certification of produce into/out of fruit fly zone(s)
7. i.e. Certification arrangements for accredited packers/'importers'
8. Monitoring systems audit

Speaker – Richard Walker NSW DPI 1.00 – 2.00

*TOPIC 4: Managing a pest-free area for Queensland fruit fly - the Australian experience*

1. The Tri-State Fruit Fly Exclusion Zone - explanation
2. Geography/Climate – context the FFEZ
3. Code of Practice for Management of Queensland Fruit Fly – Introduce

Speakers: Andrew Tomkins Vic DPI & Cathy Smallridge 2.00 – 2.15

AFTERNOON TEA 2.15 – 3.00

*TOPIC 5: Managing a pest-free area for Queensland fruit fly - action following detection of Queensland fruit fly*

Flies trapped within 1km of each other within a 2 week period, are accepted as coming from a single source.

1. Action when fly detection numbers below threshold for suspension of pest-free status
2. Triggers for response actions
3. Suspension of fruit fly pest-free area status
4. Definition of loss of pest-free area status / outbreak area / suspension area: technical committee, notification to interested parties
5. Period of suspension.

Flow Chart of Actions

Speaker: Richard Walker

3.00 – 4.30

End of day one

**DAY 2 – Wednesday 20 June 2007**

*TOPIC 6: Managing a pest-free area for Queensland fruit fly – eradication procedures for reinstatement of fruit fly pest-free status*

Bait program or an integrated bait and sterile insect release program. Reinstatement of fruit fly pest-free status is dependent on the absence of fruit flies or larvae within the suspension area.

1. Actions in the outbreak area
2. Actions in the suspension areas
3. Supplementary traps
4. Protein bait program
5. Larval search
6. Fruit collection
7. Sterile insect technique
8. Termination of eradication and re-instatement of pest-free area status.

Speaker: Richard Walker

9.00 – 10.30

MORNING TEA

10.30 – 11.00

*TOPIC 7: Managing a pest-free area for Queensland fruit fly - product control in fruit fly free areas and following suspension*

1. Product control in fruit fly free areas
2. Product control on produce following suspension of pest-freedom status.

Speaker: Richard Walker

11.00 – 11.30



*TOPIC 8: Managing a pest-free area for Queensland fruit fly - risk management components*

There is an ongoing risk of introducing fruit flies through movement of people and goods. Measures can be applied which reduce the opportunity for these introductions, including controls on the movement of susceptible produce into the zone and public relation campaigns which highlight the risk associated with the movement of infested produce by the public.

1. Approved disinfestation treatments
2. Conditions of entry
3. Control and certification applying to susceptible produce entering fruit fly free area - Certification Assurance (CA) or administrative arrangements for accredited businesses
4. Product monitoring
5. Product movement
6. Certification
  - Government
7. -Packer/Grower accreditation
8. Co-ordinated program of public awareness
9. Audit of risk management options.

Speaker: Richard Walker

11.30 – 12.30

LUNCH

12.30– 1.30

*TOPIC 9: Managing a pest-free area for Queensland fruit fly - surveillance and reporting*

1. ISPM No.6 (1997) “Guidelines for surveillance” and ISPM No.8 (1998) “Determination of pest status in an area”
2. Code of Practice for Management of Queensland Fruit Fly
3. Type of traps
4. Layout of trapping grid
5. Location of traps
6. Frequency of inspection
7. Maintenance of traps
8. Records
9. Identifications
10. Reporting system – ‘demonstration’ of “PestMon” data management.

Speaker: Richard Walker

1.30 – 3.00

*TOPIC 10: Managing a pest-free area for Queensland fruit fly*

General discussion

3.00 – 3.30

AFTERNOON TEA

3.30 – 4.00

*TOPIC 11: Managing a pest-free Area for Queensland Fruit Fly - COSTS OF OPERATING THE FFEZ*

Speakers: Andrew Tomkins, Cathy Smallridge & Richard Walker 4.00 – 5.00

End of day two

***DAY THREE – Thursday 21 June 2007***

Field visit to local fruit growing area – Indramayu, near Jakarta

All Workshop participants

***DAY FOUR – Friday 22 June 2007***

*TOPIC 12*

Discussion groups 9.30 – 10.30

1. Eradication, monitoring and risk assessment: biological, ecological, social, and cultural issues

MORNING TEA 10.30 – 11.00

*TOPIC 13*

Discussion group presentations and wrap- up session

Summary presentations by Indonesian discussion group leaders

General discussion, conclusions and workshop recommendations

End of workshop