

**Report of the APPPC Regional Training Workshop on “Integrated Control of Fruit Fly”
In tandem with the 9th International Symposium on Fruit Flies of Economic Importance
9-11 May 2014, Bangkok, Thailand**

1. Background

Tephritid fruit flies are becoming increasingly important, due to the economic importance of many species and their threat to fruit and vegetable production and trade worldwide. At the 28th Session of the Asia and Pacific Plant Protection Commission held in Jeju Island, Rep. of Korea, 23-27 September 2013, it was agreed that Thailand will host the training workshop on *Bactrocera* fruit fly surveillance, taxonomy and identification and area-wide management in tandem with the 9th International Symposium on Fruit Flies of Economic Importance in May 2014.

The APPPC Regional Training Workshop on Integrated Control of Fruit Fly in tandem with the 9th International Symposium on Fruit Flies of Economic Importance Meeting, therefore, was held during 9-11 May 2014, at Montien Riverside Hotel, Bangkok, Thailand. Thirty-one (31) delegates from 17 participating countries from Australia, Bangladesh, Cambodia, China, India, Indonesia, Lao, PDR, Malaysia, Nepal, Pakistan, Philippines, Solomon Islands, Sri Lanka, Thailand, Tonga and Vietnam, this includes experts from IAEA, AIT, DOAE of Thailand and Mexico.

2. Objectives

- 2.1 To provide technical knowledge and training to field operations staff on surveillance and baseline data collection to plan integrated fruit fly management activities including SIT application.
- 2.2 To demonstrate surveillance techniques used in fruit fly detection and control programmes, including trapping materials for adult surveys, as well as levels of infestation by fruit fly larvae.
- 2.3 To provide lectures on basic useful information for the identification of fruit fly specimens.
- 2.4 To discuss and provide protocols used for collection and shipments of live and dead fruit fly specimens.
- 2.5 To provide practice on fruit fly identification of the genera *Bactrocera*
- 2.6 To facilitate exchange of practical experiences and new knowledge on area-wide fruit fly management options and the identification skills developed.

3. Activities

- 3.1 Lectures
- 3.2 Workshops
- 3.3 Discussion
- 3.4 Technical tour

4. Results

4.1 Lectures and practical exercises

Session 1: fruit fly biology and ecology. (lectures)

- 1) *Life cycle and population dynamics by Mr. Rui Cardoso Pereira*

Participants acquired knowledge of general information of fruit flies, distribution, life cycle, host range of species, factors affecting fruit fly's population and control measures.

2) *Fruit Sampling (larval surveillance) by Mr.Rui Cardoso Pereira*

Participants acquired knowledge of fruit fly surveys (using traps), detection of larvae in various kinds of fruits, fruit sampling and data collection, analysis and infestation evaluation.

3) *Fruit fly trapping (adult surveillance) by Mr.Rui Cardoso Pereira*

Participants acquired knowledge of types of surveys, different trapping systems, attractants and species attracted, insecticides used in traps, trapping procedures, trap service and inspection, flies per trap per day (FTD) calculation and trapping density.

Session 2: fruit fly taxonomy and identification. (lecture and practice) Identification of *Bactrocera* spp. by Ms.Sunyanee Srikachar

Participants acquired knowledge of classification of fruit fly, fruit fly collection, morphology and terminology and identification of *Bactrocera* spp.. They also experienced fruit fly identification of genera *Bactrocera* from the practical exercise.

Session 3: fruit fly biological control. (lecture) Fruit fly biological control by Mr.Jorge Cancino

Participants acquired knowledge of concept and importance of biological control, fruit fly parasitoid species, fruit fly biological control in the past, factors affecting parasitoid mass rearing and releasing and campaign on biological control of fruit flies in Mexico.

Session 4: GIS and mapping GIS in fruit fly control program and practical exercise by Ms.Sirilux Noykeang

Participants acquired knowledge of GIS system, components of GIS, QGIS application, GIS data and map production. They also tried using QGIS application.

Session 5: area-wide integrated pest management of fruit flies. (lectures)

1) *Area-wide integrated pest management (AW- IPM) of tephritid fruit flies by Mr.Rui Cardoso Pereira*

Participants acquired knowledge of fruit fly problem, area-wide concept, phased conditional approach, strategic options of area-wide IPM and examples of AW-IPM programs in Brazil and Croatia.

2) *Area-wide integrated fruit fly control using SIT: case study in Chantaburi province, Thailand by Ms.Suksom Chinvinijkul*

Participants acquired knowledge of History of fruit fly control in Thailand, set up of SIT facility, fruit fly control project using GPS/GIS and sterile fruit flies at Troknong subdistrict, Khlung district, Chantaburi province.

3) *Integrated fruit fly control in rose apple orchard for export by Ms.Sunyanee Srikachar*

Participants learned from experience sharing of the research on integrated fruit fly control in rose apple orchard for export.

4) *Area-wide management of *Bactrocera* fruit flies and IPM farmers field school-base education in the greater Mekong sub-region by Mr.Prabhat Kumar*

Participants learned from experience sharing of pilot experiences of area-wide promotion and adoption of fruit fly IPM-FFS in lower Mekong river basin countries.

4.2 Technical tour: Field visit to area-wide IPM of fruit fly control at Don Khlang subdistrict, Damnoen Saduak district, Ratchaburi province

The orchard produces rose apple for export. Fruit fly is a major problem. There are 3 species found, such as *B. dorsalis*, *B. correcta* and *B. carambolae*. *B. dorsalis* is a dominant species. Fruit fly population increases in April which coincides with fruiting season and population decreases in June when there is no fruit on trees. The farmer applies 4 methods as recommended by Department of Agriculture to control fruit flies, including orchard sanitation, fruit fly population monitoring (using methyl eugenol and malathion), protein bait lures and fruit bagging. Modified traps made from plastic bottles are used to monitor fruit fly population (FTD). The fruits are protected from fruit fly infestation by bagging with white plastic bags. Bagging is done at 14 days and not later than 21 days after stamens fell off. Only 4 fruits are in a bag to meet the market standard. By applying these methods of fruit fly management, the farmer can export rose apple to China.

4.3 Conclusions

The session of biology and ecology may increase essential knowledge of participants for fruit fly management especially for NPPOs to implement system approaches (ISPM14) or establishment of pest free area for fruit fly for a specific targeted commodity production. It may also contribute to pest surveillance (ISPM6); The session of fruit fly taxonomy and identification would help participants have enhance impression on morphology of several typical species of fruit fly with highlighted specifications described and might be useful reference for identification of these species; The session of practical exercise on identification of genera *Bactrocera* enabled participants have first hand skills of identification of two species of fruit flies; The session of bio-control stressed that massive release an augmentative release of parasitoids as well as quality control and cost reduction are main elements of successful biological control of fruit flies for suppression of population; The session of GIS demonstrated value of application as a useful tool for mapping the pest distributions based on surveillance; The session of AW-IPM of ff highlighted important role of AW approach in pest control, principles of AW, phased conditional approach, strategic options of AW-IPM and examples of use of SIT and farmer field school approach at field level. It was noted that establishment of cost-covering is one of important area of sustainable use of SIT.

The pilot experiences of AW-promotion and adoption of FF IPM FFS in GMS highlighted challenges for AW-FF IPM and experiences practice in adaptation research and FFS approach during the implementation of the regional project on AW-FF IPM with outputs of ff research, capacity building, FFS, etc. The importance of partnerships, integration of innovative products/management strategies into farmers' training curricula is key to the success. A number of projects on FF management in various countries, the knowledge learned from the workshop and the practical experience shared at the workshop may benefit participants especially those are involving in program or projects of fruit fly management to have further improvements either knowledge or operational capacity as well as in public awareness and community based participatory trainings to contribute improving farmers' income by producing health products and promoting exporting products.

It was proposed to strengthen networking of collaboration among countries in fruit fly management including information exchange and resource sharing. Area-wide IPM should be promoted in every country with financial and technical supports.

Agenda

DAY 1 : Friday, 9 May 2014

- 09:00 - 09:15 **Opening and Welcome**
09:15 - 09:30 **Introduction Administrative issues**

SESSION I: Fruit fly biology and ecology

- 09:30 - 10:30 Life cycle and population dynamics (**Rui Pereira**)

COFFEE BREAK

- 11:00 - 12:30 Fruit fly surveillance (**Rui Pereira**)

LUNCH

SESSION II: Fruit fly taxonomy and identification

- 13:30 - 14:30 Fruit fly identification of genera *Bactrocera* (Sunyanee Srikachar)

COFFEE BREAK

- 15:30 - 17:00 Practice fruit fly identification of genera *Bactrocera* (Sunyanee Srikachar)
17:00 - 17:30 General discussion and close of day 1

DAY 2 : Saturday, 10 May 2014

SESSION III: Fruit Fly Parasitoids

- 08:30 - 09:30 Fruit fly parasitoid and utilization (**Jorge Cacino**)

SESSION IV: GIS, mapping

- 09:30 - 10:30 GIS in Fruit fly control programme and practical exercise (Sirilux Noykeang)

COFFEE BREAK

11:00 - 12:30 Practical exercise (cont.) (Sirilux Noykeang)

LUNCH

SESSION V: AW-IPM of Fruit fly

13:30 - 14:30 Concept of area-wide integrated insect pest control and study cases (Rui Pereira)

14:30 - 15:00 Area-wide integrated Fruit Fly control using SIT : Case study in Chantaburi province, Thailand (Suksom Chinvinijkul)

COFFEE BREAK

15:30 - 16:00 Integrated Fruit Fly control in Rose Apple orchard for export (Sunyanee Srikachar)

16:00 - 17:00 Area-wide management of *Bactrocera* Fruit Flies and IPM Farmers Field School-based education in the Greater Mekong Sub-region (Prabhat Kumar)

17:00 - 18:00 Discussion on status of fruit fly in each country and how to cooperate and collaboration on fruit fly control among Asia and Pacific countries (Piao Yongfan, Rui Pereira and Watchreeporn Orankanok)

DAY 3 : Sunday, 11 May 2014

08:00 - 17:00 Technical tour for AW-IPM of FF control in Ratchaburi province

List of Participants

Australia

Mr. Adam Dawes
Horticulture Export Operations
0437370723
Department of Agriculture
GPO Box 858, Canberra ACT 2601
Australia
Email: adam.dawes@daff.gov.au

Bangladesh

Mr. Abu Sayed Md. Fazla Alahi
Quarantine Entomologist
Plant Quarantine Centre
Hili, Hakimpur, Dinajpur
Bangladesh
Mobile: 01716199508
Email: sayedalahi@yahoo.com

Cambodia

Mr. Cheythyrieth Chou
42, St 01, Sangkat Chom Chov
Phnom Penh, Cambodia
Tel: +855 12826 692
Email: thyrieth.faoipm@online.com.kh;
Thyrieth72@gmail.com

China

1.Ms. GuiFen Zhang
Institute of Plant Protection
Chinese Academy of Agricultural Sciences
#2 YuanMingYuan West Road
HaiDian, Beijing, 100193
China
Tel: 86 10 82109572 (O)
Email:Guifenzhang3@163.com
zhangguifen@caas.cn

2.Ms. Li Ping
Senior Agronomist
Division of Crop Pest Control
National Agro-technical Extension &
Service Center

Ministry of Agriculture, P.R.China

India

Shri P.K. Ghosh
Assistant Director (E)
CIPMC, Sector-3, F.B. Block
Salt Lake City, Kolkata (West Bengal) –
700097
Tel: 033-23212183
Mob: 09433320805
Email: pkghoshentomo@gmail.com

Indonesia

Mr. Slamet Budiawan
Plant Quarantine Inspector
Center for Engineering and the application
test method
Agency for Agricultural Quarantine
Email: sbudiawangm@gmail.com
Mobile: +62 8128783779

Lao, PDR

Mr. Khanxay Somchanda
Entomologist
Plant Protection Centre
Department of Agriculture
Ministry of Agriculture and Forestry
P.O. Box 811 Vientiane
Lao, PDR
Tel: (+856) 21 812164
Email: khbombay2004@yahoo.com

Malaysia

Mr. Muhamad Zulhisham Bin Jusoh
Plant Bio-security Division
Department of Agriculture, Jln Gallagher
50632 Kuala Lumpur
Malaysia
Tel: 019-9570579
Email: zulhisham@doa.gov.my

Myanmar

Mr. Shine Shane Naing
Deputy Assistant Staff Officer
Department of Agriculture
Ministry of Agriculture and Irrigation
Tel: 09421022813
Email: shineshanenaingyau@gamil.com

Nepal

Mr. Surya Kanta Sapkota
Plant Protection Officer
Regional Plant Protection Laboratory
Bhotewadar V.D.C., Ward No.-8
Balunehautara, Lamjung District
Gandaki Zone, Nepal
Email: suryakantasapkota@gmail.com.

Pakistan

Mr. Bhugro Mal
Senior Scientific Officer
Southern Agricultural Research Centre
(SARC)
PARC, Old Block 9 & 10, Karachi
University Campus
Karachi, Pakistan
Tel: +92 21 99261557
Cell # +92 3023052854
Email: Bmal72parc@gmail.com

Philippines

Ms. Helen G. Bignayan
Senior Agriculturist
Bureau of Plant Industry
692 San Andres St., Malate, Manila
Tel: (+632) 404-0409
Mobile No.: (+63919) 226-9006
Email : hgbignayan@yahoo.com

Solomon Islands

Mr Crispus Ramo Fanai
Chief Quarantine Officer - Surveillance
Biosecurity Solomon Islands
Ministry of Agriculture & Livestock
P O Box G13
Honiara, Solomon Islands
Tel: (w) 677 24658 (M) 677 7436173

Email: fcrispus@gmail.com

Sri Lanka

Mrs. A.S. Pushpakumari
Research Officer
Fruit Research Development Institute,
Horana
Sri Lanka
Tel : 0094714436795
Email : shyamapk2003@yahoo.com

Thailand

1. Ms. Korrakot Damrak
Entomologist
Plant Protection Research and Development
Office
Department of Agriculture
Ministry of Agriculture and Cooperatives
50 Phahonyothin Road, Ladyao
Chatuchak, Bangkok 10900
Tel: 66 2 579 5583
Mobile: 08 9591 5153
Email: korrakot@yahoo.com

2. Mrs. Sirada Timprasert
Subject Matter Specialist
Department of Agricultural Extension
Tel/Fax: 66 2 940 6179
Email: siradatmp@gmail.com

Tonga

Ms. Siutoni Tupou
P.O.Box 14
Nuku'alofa
Tonga
Email: siutonit@gmail.com;
fruitfly@kalianet.to

Vietnam

Ms. Hoang Kim Thoa
Head of Entomology Group
Plant Pest Diagnostic & Identification
Division
Plant Quarantine Diagnostic Centre (PQDC)
Plant Protection Department (PPD)
149 Ho Dac Di, Dong Da, Hanoi, Vietnam
Tel. No: (84) 4 3857 3424

Fax No: (84) 4 3851 3746
Email: thoa_hoangkim75@yahoo.com

Observers

1. Ms. Sumana Simasalit
Subject matter specialist
Department of Agri. Extension, Paholyothin Rd.
Bangkhean, Bangkok, 10900
Mobile : 0865576868
Email sumana_sima@hotmail.com

2. Ms. Sudarat Chamchoi
Subject matter specialist
Department of Agri. Extension, Paholyothin Rd.
Bangkhean, Bangkok, 10900
Mobile: 0896148391
Email bio53@hotmail.com

Experts

1. Mr. Rui Cardoso Pereira
International Atomic Energy Agency
Department of Nuclear Sciences and Applications
Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture
Insect Pest Control Section
Vienna International Centre
P.O. Box 100, 1400 Wien, Austria
Tel.: 0043 1 2600 26077
Fax: 0043 1 26007
E-mail : R.Cardoso-Pereira@iaea.org

2. Mr. Jorge Cancino
Programa Moscafrut
Camino Cacahoatales S/N, Metapa de Dominguez, Chiapas
Mexico 30860
Email: Jorge.cancino@iica-moscafrut.org.mx
Tel: 962 64 3 5059
Fax: 962 64 35059

3. Dr. Prabhat Kumar
Director, Asian Center of Innovation for Sustainable Agriculture Intensification (ACISAI)

Regional Coordinator, SRI-LMB Project
(An EU funded Global Agriculture Research for Development Initiative)
Asian Institute of Technology, PO Box 4,
Khlong Luang 12120
Pathumthani, Thailand
Tel: +66-2-524-5827
Mobile : +66-860978283
Fax: +66-2-524-5828
Email: [kipm@yahoo.com](mailto:pkipm@yahoo.com)
Website: www.ait.asia

4. Mrs. Sirilux Noikeaing
ICT Centre, Department of Agricultural Extension
Phahonyothin Road, Chatuchak, Bangkok 10900
Tel: 66 2 579 0121 ext. 169
Email: siriluxr@gmail.com

5. Ms. Suksom Chinvinijkul
Bureau of Agri. Product Quality Development
Department of Agricultural Extension
Phahonyothin Road, Chatuchak, Bangkok 10900
Email: chinvinijkuls@gmail.com
Tel: 02 9406179

6. Ms. Sunyane Srikachar
Plant Protection Research and Development Office
Department of Agriculture, Chatuchak, Bangkok 10220
Email: sunyaneesrikachar@gmail.com
Tel: 025795583
Fax : 029405396

Course Director

Ms. Watchreeporn Orankanok
Director, Pest Management Division
Bureau of Agricultural Product Quality Development
Department of Agricultural Extension
Paholyothin Road, Chatujak
Bangkok 10900
Email: Watchreeporn@yahoo.com
Tel: +66 29406187, +66 25792132

Course Corespondent

Ms. Khanitha Phongpreecha
Subject matter specialist
Bureau of Agricultural Product Quality
Development
Department of Agricultural Extension
Paholyothin Road, Chatujak
Bangkok 10900
Tel : +66 29955 1626 ; +66 2579 2132
Email : ykhanitha@gmail.com

FAO/RAP

1.Mr. Piao Yongfan
Senior Plant Protection Officer
Food and Agriculture Organization of the
United Nations (FAO/UN)
39, Maliwan Mansion, Pra Atit Road,
Banglumpoo
Bangkok 10200
Tel: 66 2 697 4268
Email: Yongfan.Piao@fao.org

2.Ms. Nongyao Ruenglertpanya
Secretary
Food and Agriculture Organization of the
United Nations (FAO/UN)
39, Maliwan Mansion, Pra Atit Road,
Banglumpoo
Bangkok 10200
Tel: 66 2 697 4264
Email: N.Ruenglertpanya@fao.org

IPM Programme

Ms. Alma Linda C. Morales-Abubakar
Programme Development Officer
FAO Inter-Country Programme for IPM and
Pesticide Risk Reduction in South and
Southeast Asia
FAO Regional Office for Asia and the
Pacific
39 Maliwan Mansion, Phra Atit Road
Bangkok 10200, Thailand
Tel: 662 697 4180
Fax: 662 697 4422
Email: AlmaLinda.Abubakar@fao.org