Food and Agriculture Organization of the United Nations

CIHEAM

Scientific Consultation and High-Level Meeting on Red Palm Weevil Management

Management Programs and Challenges in Red Palm Weevil (RPW) Control in the Asia and Pacific Countries

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Malaysia


THE
EVIL
WEEVILS
MASTERJII

THE SITUATION

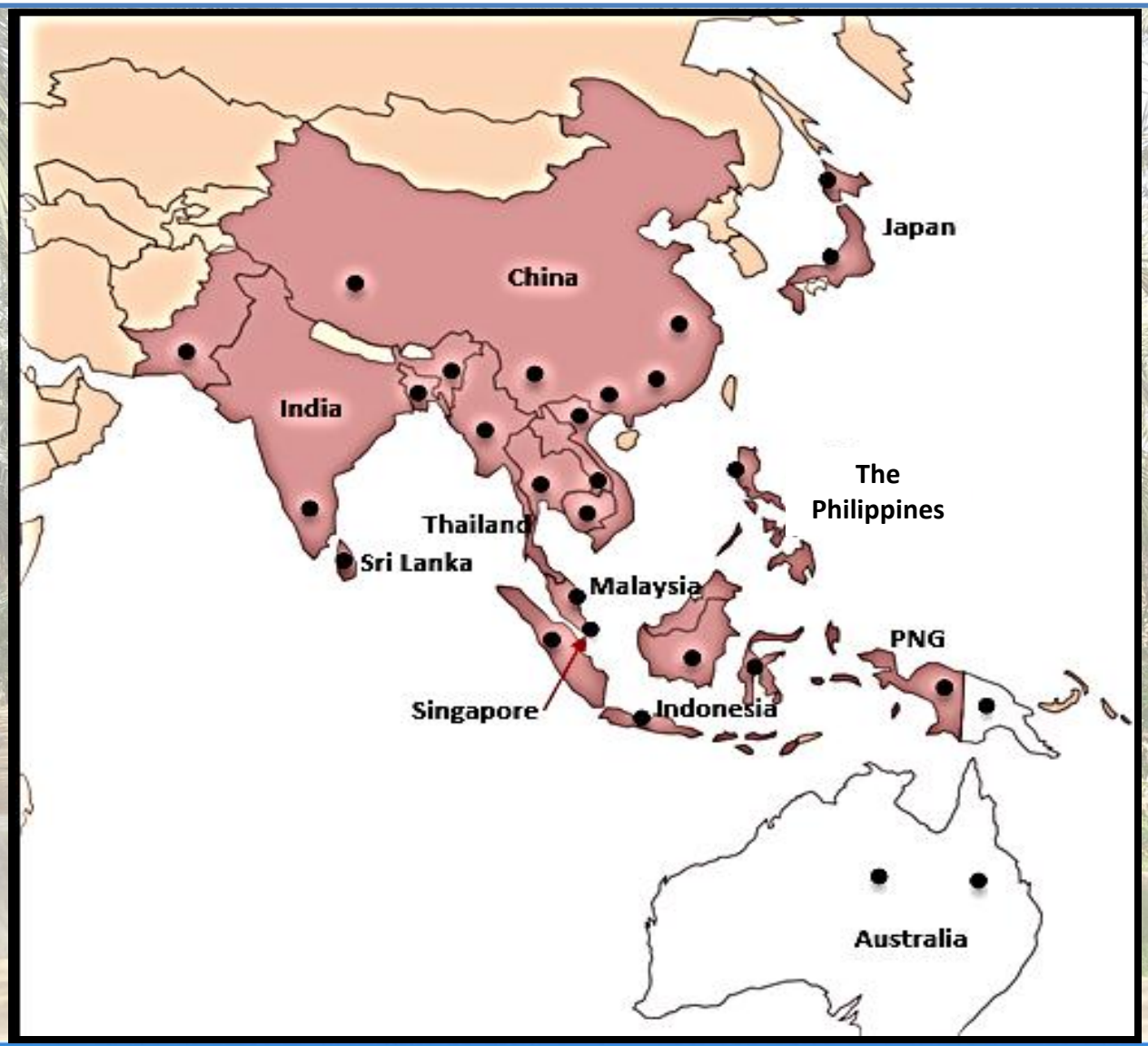
INTRODUCTION

- Red palm weevil is the most devastating pest of coconut in Malaysia
- Red palm weevil is considered to be one of the most destructive pests of palm in the world
- This pest has killed millions of palms in countries it has invaded
- It also attacks a wide range of ornamental palms.
- Severely attacked plants exhibit a total loss of foliage and rotting of the trunk, which eventually results in the death of the tree.

INTRODUCTION

The coconut 'Tree of Life' in Malaysia ranks fifth after oil palm, rubber, paddy and fruits in terms of acreage.

DISTRIBUTION OF RPW IN ASIA PACIFIC COUNTRIES



Host of Red Palm Weevil

Common name	Scientific name
Betelnut palm	*Areca catechu*
Queen palm	*Arecastrum romanzoffianum*
Sugar palm	*Arenga pinnata*
Toddy palm	*Borassus flabellifer*
Madagascar palm	*Bismarckia nobilis*
Palasan	*Calamus merrillii*
Fishtail palm	*Caryota cumingii*
Mountain fish tail palm	*Caryota maxima*
Coconut	*Cocos nucifera*
Gebang palm	*Corypha utan (= C. gebanga and C. elata)*
Oil palm	*Elaeis guineensis*
Ribbon fan palm	*Livistona decipiens*
Chinese fan palm	*Livistona chinensis var. subglobosa*

Host of Red Palm Weevil

Common name	Scientific name
Sago palm	*Metroxylon sagu*
Thorny palm	*Oncosperma horrida*
Nibung palm	*Oncosperma tigillarium*
Cuban royal palm	*Roystonea regia*
Canary island palm	*Phoenix canariensis*
Date palm	*Phoenix dactylifera*
East indian wine palm	*Phoenix sylvestris*
Regal palm	*Roystonea regia*
Hispaniola palm	*Sabal blackburniana* (*=umbraculifera*)
Chinese windmill palm	*Trachycarpus fortunei*
Washington palms	*Washingtonia* sp.

Countries	Status	Host Range	Control Measures	Awareness	Remarks
Malaysia	Under control Serious in one state	*i.* *Cocos nucifera* – coconut ii. Metoxylon sagu – Sago palm iii. *Livistona* spp. – cabbage palm iv. *Roystonia* spp. – royal palm v. *Bismarkia nobilis* – *Madagascar Palm* vi. *Phoenix dactylifera* - *Date palms* *viii.*	i. Trapping ii. Trunk injection iii. Population destruction iv. Soil Drenching v. Spraying (for small palms)	a. Campaign in 2016 b. Communication material in 2016, 2017 – Pamphlet c. IPM, FFS- 2016, 2017 d. SOP has been produced e. Media plan in 2016	Detected in certain parts of the country, mainly in the north of the Peninsula Gazatted as dangerous pest

Countries	Status	Host Range	Control Measures	Awareness	Remarks
Sri Lanka	Under control	i. *Cocos nucifera* – coconut ii. *Caryota urens* – toddy palm, fishtail palm, jiggery palm iii. *Livistona* spp. – cabbage palm iv. *Roystonia* spp. – royal palm v. *Lodoicea maldivica* – double coconut palm vi. *Dypsis lutescens* – cane palm	i. Trapping ii. Trunk injection iii. Population destruction	a. 18 (2015) and 20 (2016) - Advocacy and awareness programmes b. Communication material in 2016 – Pamphlet c. IPM, FFS	If the farmers are inspecting their young palms at least once in 3 weeks the death of palm can be prevented. Regular inspection programme is a must in RPW IPM. We have developed an electronic device to detect RPW infested coconut palms.
Thailand	Not Serious	i. *Cocos nucifera* Coconut ii. *Elaeis guineensis* - Oil palm iii. *Metroxylon sagu* - Sago palm	i. Chemical spraying	Legislation (if RPW gazetted as PQ or Dangerous pest in the existing laws, regulation or degree)	-

Countries	Status	Host Range	Control Measures	Awareness	Remarks
Vietnam	Under Control	i. *Cocos nucifera* - Coconut *ii. Roystonea regia*	i.Trapping ii.Trunk injection iii.Chemical spraying iv.Population destruction v.Manual destruction of Grub (food)	IPM FFS	RPW is the major pest in coconut trees, but only found in Mekong delta. RPW is the main pest but it causes heavy damage to each very small area so it is not investigated and reported regularly. Vietnamese love to eat RPW larvae, but in the law of Vietnam prohibits rearing and selling all pests because high risk of spread. Farmers take a variety of preventive measures but only in very narrow areas where RPW is heavily damaged. It can be said that people are natural enemies of RPW in Vietnam.
Philippines	Serious	*i.Cocos nucifera* – Coconut ii.Others (To be validated)	i. Trunk injection ii.Chemical spraying iii.Population destruction	One Advocacy and awareness programmes in 2015	In the Philippines , it is observed that most trees showing symptoms of RPW can be seen along the road and backyard coconut trees . No big areas can be seen damaged by it at one time but slowly the trees are dying one at a time. This is a very serious problem and must be addressed soon.

RPW Infestation: Signs and Symptoms

Coconut trees
(*Cocos nucifera*)

Heavy Infestation by Red Palm Weevil

SKIRTING

CROWN COLLAPSE

CROWN COLLAPSE

Heavily infested of Red Palm Weevil on coconut frond and stem

Borer hole and brown discoloration at junction of coconut frond and stem

Shoot turns yellow and fronds start to droop

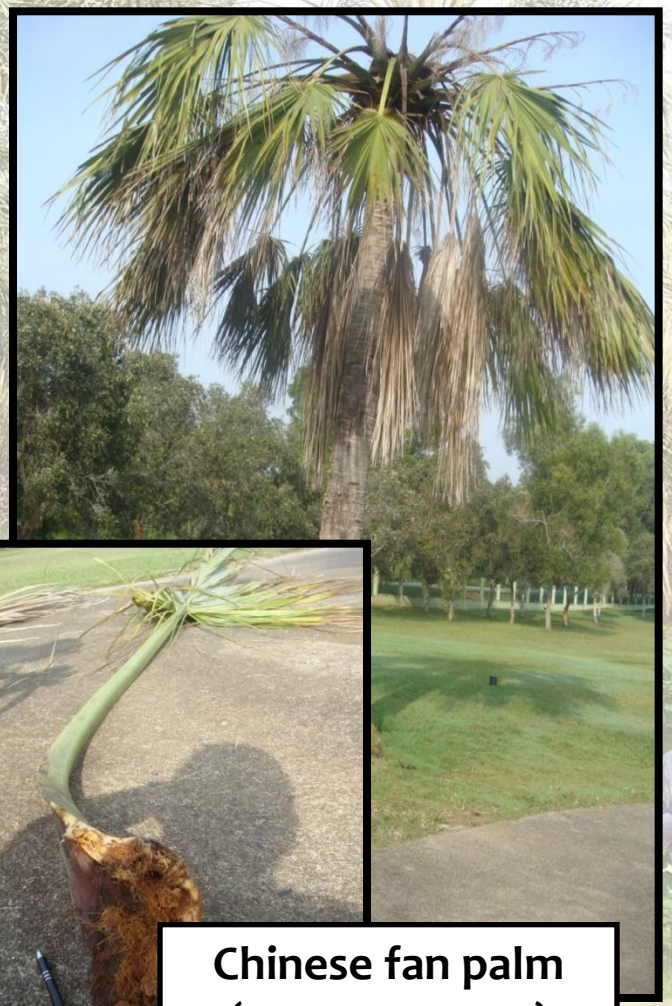
Presence of tunnels in the coconut trunk.
- Weevil larvae bore tunnel in the coconut trunk

Tunnels due to larvae boring actions

SYMPTOM OF RPW ATTACKS: VARIOUS PLANT SPECIES

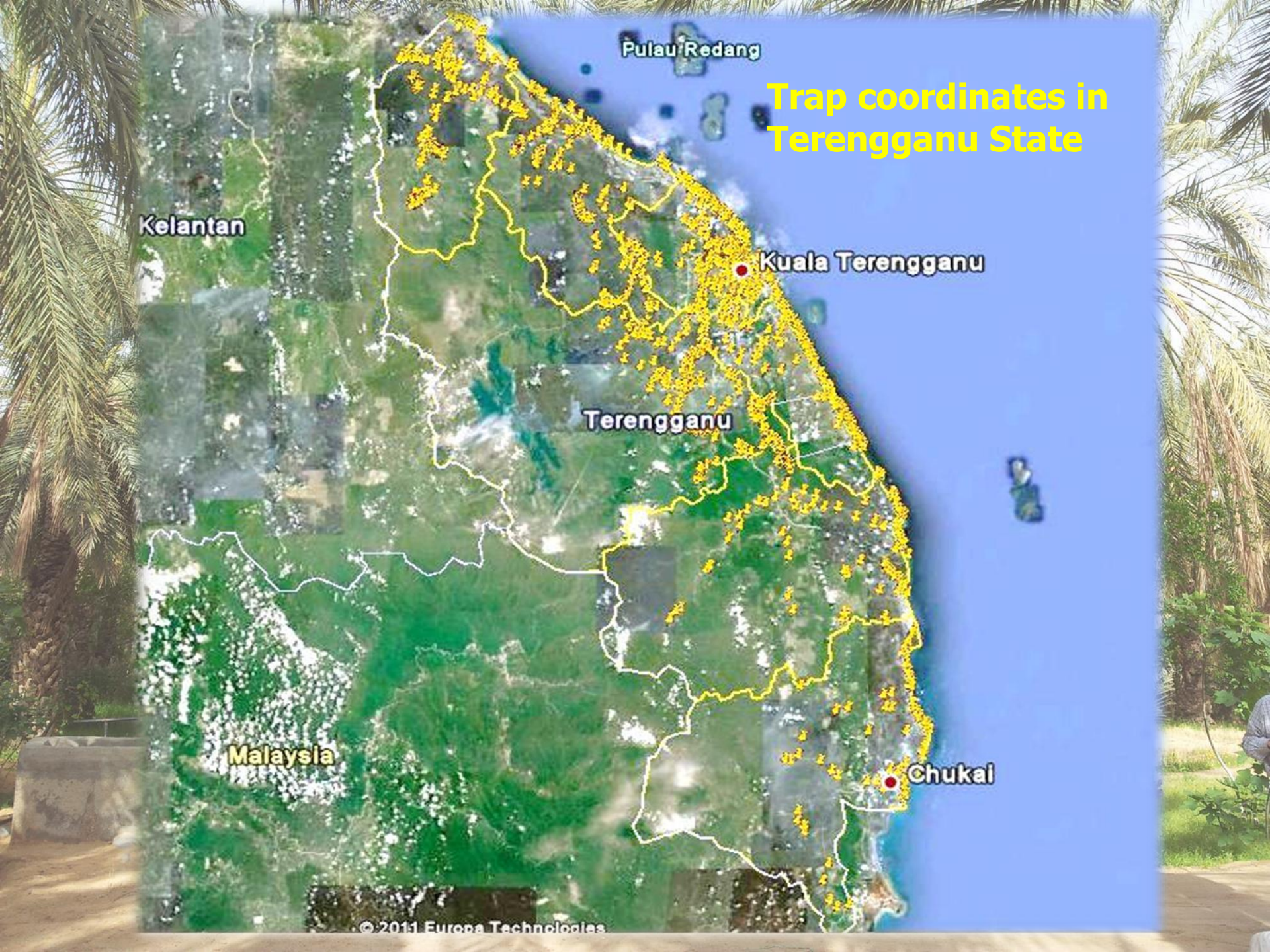
Regal Palm
(*Roystonea regia*)

Madagascar Palm
(*Bismarckia nobilis*)



Chinese fan palm
(*Livistona chinensis*)

Date palm
(*Phoenix dactylifera*)


Trap coordinates in Terengganu State
Pulau Redang
Kelantan
Kuala Terengganu
Terengganu
Malaysia
Chukai
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Issues and Challenges

ISSUES & CHALLENGES

Legislature – Is it enough?

Level of Technical Capability

Insufficient Manpower

Lack of Stakeholders cooperation

Commitments and prioritisation

Financial Commitments

Management Program

INTEGRATED MANAGEMENT PROGRAM

The control of the red palm weevil needs the adoption of an *integrated control management approach*. The approach carried out in Malaysia includes in a complementary and inseparable way, the following issues:

- **Legal Actions – Quarantine law and regulations**
- **Surveillance - Detection and monitoring**
- **Educational and informative activities**
- **Control, contain and eradicate**
- **Applied Research**
- **Coordination**

LEGAL ACTIONS

Malaysian Government Legislative Control

1) In an effort to control and eradicate pests and diseases that are deemed dangerous, the Department of Agriculture has gazetted RPW as a dangerous pest according to the Plant Quarantine Act 1976
2) Palm importation from countries is prohibited
3) Illegal entry of infested planting material still occured

LEGAL ACTIONS

THIRD SCHEDULE
(Regulations 8 and 11)
PLANTS WHICH SHALL BE DESTROYED IF IMPORTED IN CONTRAVENTION OF THESE REGULATIONS

Ananas comosus (L.) Merr. (Pineapple)
All species of Artocarpus (Keledang)
Camellia sinensis (L.) Kuntze. (Tea)
Carica papaya L. (Papaya)
All species of Citrus and allied genera
All species of Coffea (Coffee)
All species of Colocasia and Zanthosoma (Taro)
Durio zibethinus Murr. (Durian)
All species of Forest trees
Glycine max (L.) Merr.
All species of Gossypium (Cotton)
All species of Hevea (Rubber)
Ipomoea batatas Poir. (Sweet potato)
All species of Leguminosae
All species of Mangifera
All species of Manihot (Cassavae)
All species of Musa and allied genera (Banana, Plantains and Manila hemp)
All species of Nephelium
All species of Nicotiana (Tobaccoes)
All members of the Orchidaccae
Oryza sativa L. (Rice)

All members of the Palmaceae (coconut, oil palm and other palms)

All members of the Piperaceae (Peppers)
All species of Saccharum (Sugarcane)
Solanum tuberosum L. (Potato)
Zea mays L. (Maize)

SURVEILLANCE

Pheromone Trapping for Early Detection

- Sugar cane = 400gm
- Water = 600 ml
- Pheromone plastic cover ¼ opened
- Detergent

SURVEILLANCE

Pheromone traps are used for early detection and for monitoring purposes to calculate the RTD

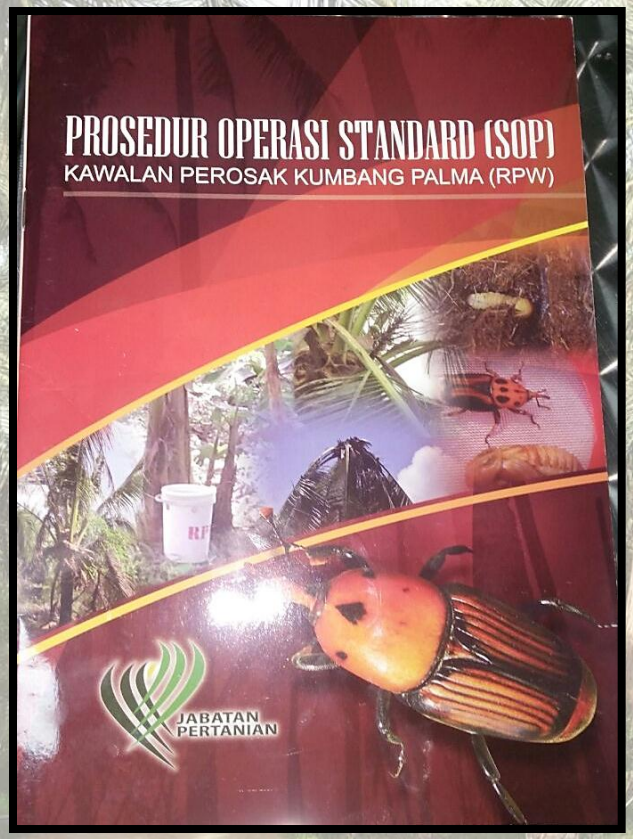
For areas with RTD<1, Control measures put in place to maintain RTD<1 for two years to declare pest free area

For areas with RTD>1, focus on control, contain and eradication activities

SURVEILLANCE

- ü **Early detection is important to avoid further infestation**
- ü **Important to train the staff, farmers and individual to recognize early symptoms**

EDUCATIONAL AND INFORMATIVE ACTIVITIES



Standard Operating Procedure For Red Palm Weevil Control

RPW Info Sheets

EDUCATIONAL AND INFORMATIVE ACIVITIES

Documents/Editorials

Posters – RPW Information

Educational and Informative Activities

- Malaysia:
  - Public Awareness on pest threat
  - Refresh public on illegal movement of palms into country
  - Train staff and farmers
- Philippines:
  - Campaign in 2015

Public Awareness and Education Program


24 K2

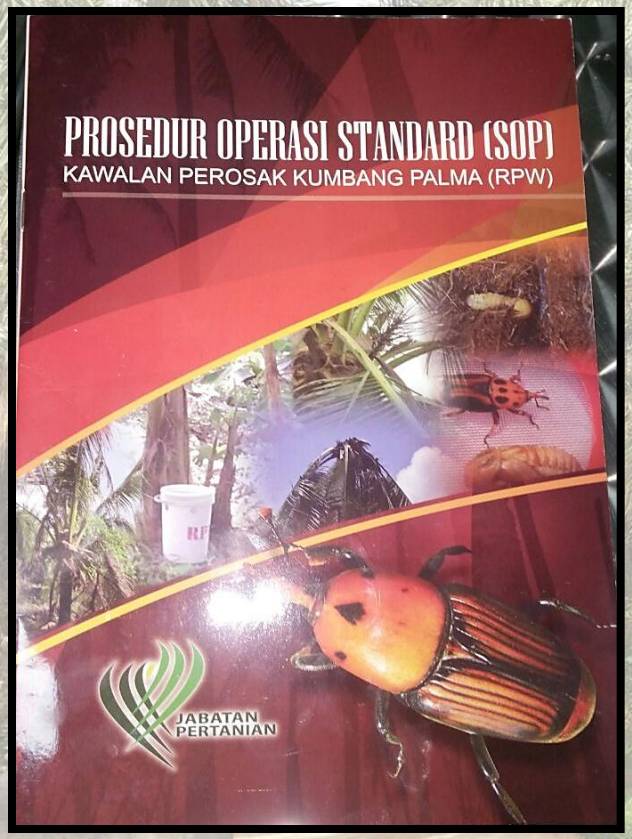
ISU

Perangkap feromon kawal kumbang palma

Kumbang merah ancam kelapa sawit

Educational and Informative Activities

CONTROL, CONTAIN AND ERADICATE



SOP

Standard Operating Procedure was formulated based on several International Standards for Phytosanitary Measures regarding surveillance, pest control, eradication, and emergency response

CONTROL, CONTAIN AND ERADICATE

The RPW control programme in Malaysia is based on IPM

- Biological Control
- Mechanical Control
- Chemical Control
- Cultural Control

CONTROL, CONTAIN AND ERADICATE

A. Biological Method

1. Biological Agent – Concerted effort on Biological method to control RPW is being studied. The potential candidates is :

   - Nematode - *Steinernema carpocapsae* can cause over 80% mortality of weevils under field conditions when applied in a chitosan formulation (Dembilio et al., 2010, Llacer et al., 2009)
   - Entomopathogenic fungus
   - *Metarhizium anisopliae*
   - Mites *(Rhynchopolipus rhynchophori* (Ewing) (Abdullah, 2009), *Rhynchopolipus swiftae* (Husband and Connor 1999)

CONTROL, CONTAIN AND ERADICATE

A. Biological Method

2. Biological control agents are useful for suppressing pest populations, but rarely eradicate them. Even when effective under laboratory conditions; do not provide adequate control of red palm weevil in the field

CONTROL, CONTAIN AND ERADICATE

B. Mechanical/Physical Method

Mass trapping:

Use of pheromone trap for attracting weevils. Pheromone : ferrugion, ferrolure of tripheron

Trap design : 15L plastic bucket with a height of 30 cm and drill 4 holes measuring 10 cm^2 each around the bucket

Observation: the most attractive color for RPW is Dark Blue

30 meters distance between traps

CONTROL, CONTAIN AND ERADICATE

Mass trapping

Pheromone - Bait Food / Mass trapping using a mix of materials such as traps, groceries (food bait), and pheromone lures food bait to be used : sugar cane or pineapple

CONTROL, CONTAIN AND ERADICATE

•Chemical Control

•Small Trees
Pesticides sprayed or poured onto the crown with insecticides such as diazinon, carbaryl or nurelle

•Tall Trees
Stem injection - chemicals namely monocrotophos or methamidophos- the effectiveness depends on the physical condition of the tree, weather (evapotranspiration)

•Tall Trees

•Soil Drenching
Insecticide is poured directly to the base of the plant and the soil around it

CONTROL, CONTAIN AND ERADICATE

TRUNK INJECTION

Drenching from Tree Crown

Soil Drenching

CONTROL, CONTAIN AND ERADICATE

D. Cultural Practice

Objective: Suppress RPWs population by minimizing the conditions they need to live (water, shelter, food)

Practice clean cultivation by cutting and removing palms already damaged and the decaying stumps in the garden

Avoid injury to the trunk as the pest lay eggs in these wounds

CONTROL, CONTAIN AND ERADICATE

D. Cultural Practice

Control Rhinoceros beetle *Oryctes rhynocerous* primary attack to prevent a secondary attack by RPW. Use of black light/ ultra violet light trap, pheromone trap and organic trap

Destroy palms at the first sign of larval weevil infestations by cutting down, shredding into small pieces, and burning, all infested palms. This practice will prevent larvae from hatching and re-infesting an area

CONTROL, CONTAIN AND ERADICATE

CONTROL, CONTAIN AND ERADICATE

Sanitation

Effected trees are cut and burned to avoid any live RPW

CONTROL, CONTAIN AND ERADICATE

Malaysia

Strategy – to concentrate control activities in areas with RTD more than 1 (RTD >1) Eradication program currently on going and focus on these hot spots

Maintain other areas with RTD less than 1(RTD<1)

ERADICATION PROGRAMME

Not very successful due to:

- Difficulties in early detection
- Quarantine treatment is not available
- Integrated control program is not completely in place
- Condition of palms and location
- Reluctance of using chemical pesticides on highly productive palm trees - especially Coconut and Dates
- Co-operation, support and focus lacking among farmers and stakeholders

APPLIED RESEARCH

- By universities
- Government research bodies

Dr Wahizatul (UMT) research focuses on the red palm weevil and ways to use its "natural enemy", the entomopathogenic fungi (EPF), to control its spread. Award: L'oreal-Unesco for Women in Science National Fellowship 2014 grant

COORDINATIONS

Malaysia:

- Committees at National, Departmental and State Level
- Multi disciplinary members: Related ministry, researchers and NPPO (Lead)
- Policy and control measures coordination;
- Collaboration among agencies,
- Exchange of information,
- Sharing research findings on biology and control of RPW
- Assistance and co-operation from HQ to states/districts level

Is Oil Palm Industry in Malaysia is Safe ?

Steps have been taken urgently to eradicate the pest and prevent its spread to other palm trees, particularly, from causing catastrophic damages to the RM 60 billion oil palm sector which is a very significant contributor to the country's income and provider of employment.

What Next?

CONCLUSIONS

01

Concerted efforts are needed to manage the RPW

02

Need for comprehensive, multi-disciplinary plan to control, contain and eradicate RPW

03

Authorities at highest level need to commit to the efforts

THANK YOU