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

Management programs and challenges in RPW Control in Near East and North African Region

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Rome, 29-31 March, 2017



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- **Red palm weevil (RPW), *Rhynchophorus ferrugineus* (Olivier), is category-1 pest on date palms in the Middle-East countries.**
- **RPW mostly attacks young palm trees under the age of 20 years**
- **In date palms, mostly infestation starts from the base; while in other palms infestation starts from crown region**





Categorization of Infestation Level



Dead

Heavy

Medium

Mild

Healthy



Challenges in red palm weevil control

- **Weak enforcement of quarantine regulations.**
- **Early detection difficulties of RPW infestation.**
- **Farming system.**
- **Lack of adequate human and financial resources.**
- **Lack of active involvement/ training of farmers.**
- **Lack of structured RPW-IPM program.**
- **Weak R & D coordination.**





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Current measures to control red palm weevil

- Regular inspection and monitoring.
- Population disruption (pheromone trapping) .
- Insecticide treatments.
- Plant quarantine.
- Extension programs.





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Analysis of the management program components



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Quarantine Regulations

1. Awareness to implement phytosanitary measures.
2. Insufficient resources to effectively implement regulations.
3. Availability of registered palm nurseries.
4. Traceability (source and subsequent movement) of transported palms – tags?.





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Early Detection

Mainly Visual inspection.

**Advanced methods of detection:
Many, but still under studies.**

Remote sensing, acoustics, thermal imaging, chemical signatures, laser induced breakdown spectroscopy, near infrared spectroscopy, X-ray, biological and physiological stress indicators, sniffer dogs etc.





Early Detection

- **Limited number of trained personnel for visual inspection.**
- **Visual inspection is laborious, hard, and costly.**
- **Badly managed date farms with growth of offshoots, weeds etc.**
- **Where infestation occurs in the crown (Canary Palm) visual detection needs specific training.**
- **Weak involvement of date palm growers, municipalities etc. in the periodic visual inspection.**



Visual Detection of RPW Infestation



1. Tunnels on trunks and frond petiole bases



2. Oozing thick brown liquid



3. Frass with fermenting odor



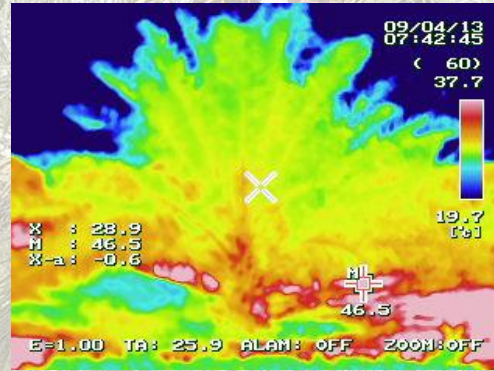
4. Weevil and cocoon remains



Infestation Detection with different optical devices.



Digital Camera
Assessment



Thermal Camera
Assessment



Radar 2000
Assessment



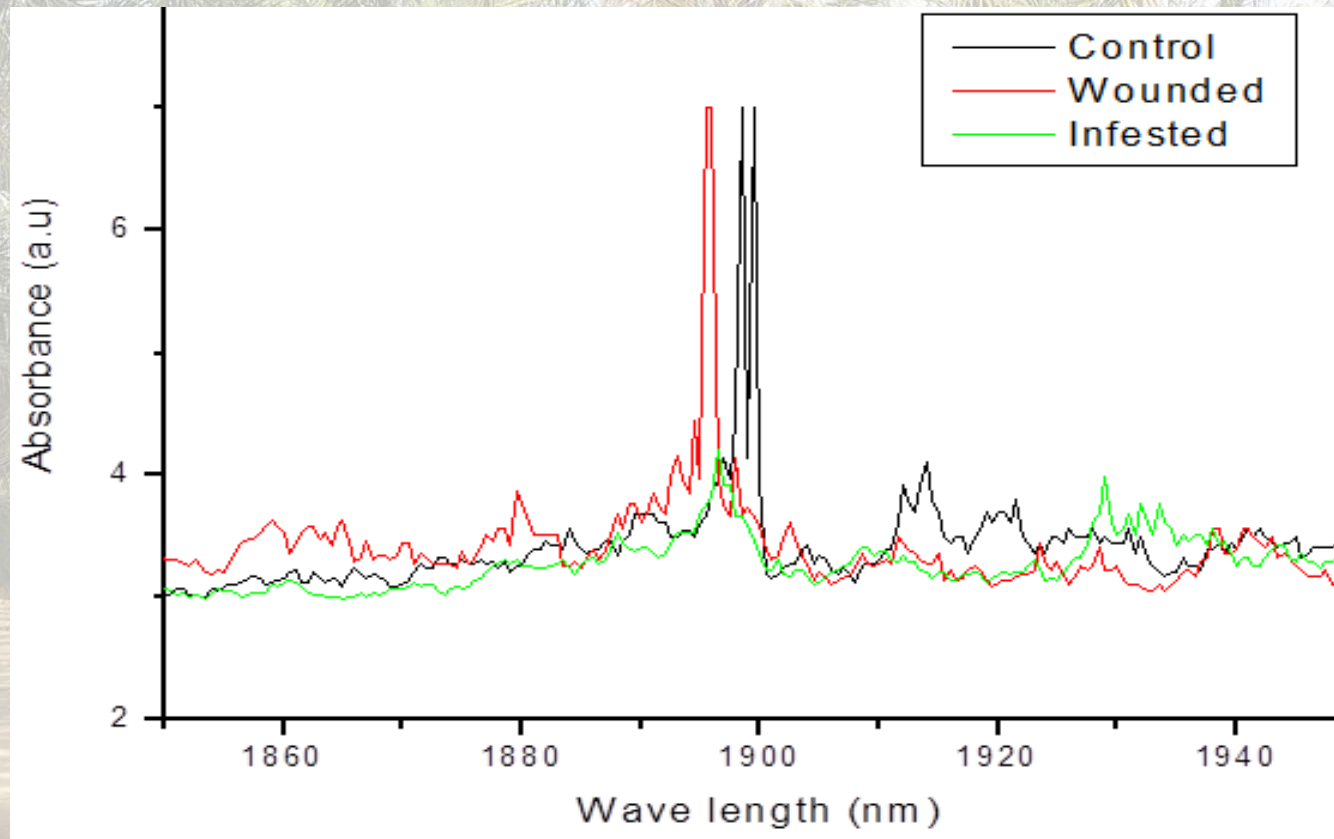
Radar 900
Assessment



Resistograph
Assessment



Near-infrared Spectroscopy application



Response of the leaf spectral absorbance to control, wounded and infested date palm leaves in SWIR range (1850nm to 1950nm).



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Surveillance and Monitoring

Surveillance and monitoring of RPW is carried out:

- **Visual inspection**
- **Pheromone trapping in both infested and non-infested areas.**





Surveillance and Monitoring

- **Inadequate visual inspections.**
- **Weak participation in this program.**
- **Periodic trap servicing and inspection.**
- **Mapping systems, data collection and management decision.**
- **Advanced monitoring tools.**
- **Large number of ornamental palms in municipality areas not under surveillance program.**





Cultural Practices

- 1. Agricultural practices (palm spacing, irrigation, palm and field sanitation, frond and offshoot removal) influence infestation.**
- 2. Inspection of palms and treatment are difficult.**
- 3. Movement away from traditional practices is challenging due to financial constraints and lack of manpower.**





Insecticides issues

- 1. Preventive sprays and removal of infested date palms.**
- 2. Preventive injection in ornamental palms.**
- 3. Insecticides not tested and registered.**
- 4. Insecticide residues.**
- 5. Insecticides resistance .**
- 6. Training on preventive treatment applications.**





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Curative Insecticide Treatments

- **Injection and sprays.**
- **Sanitization.**
- **Fumigation.**



Insecticides testing and registration



2 Longitudinal section

Date palm dissection procedure



Then, observe the
RPW in each plate of
quarter





Mass Trapping

- **Food baited pheromone traps (service, transportation).**
- **Bait free pheromone traps.**
- **Mapping traps location.**
- **Automated traps.**





Biological Control

- Entomopathogenic Nematodes.
- *Beauveria bassiana*
- Unsolved delivery techniques.
- Weather factors.



Components of RPW-IPM





Removal and disposal of highly infested Palms

- Not applied in correct manner (remain in the field).
- Infested vs. severely infested palms removal.
- Proper treatment, safe transportation, or no onsite facilities for disposal.
- Guidelines for removal and safe disposal.
- No assessment of the degree of damage to be disposed of.





Data Management/ GIS / Validation

- **Limited data management systems (collection, transmission, management, analysis and outputs).**
- **No user friendly applications.**
- **Stakeholders are not familiar with remote sensing and GIS assisted data management systems and their advantages.**
- **Currently, manual recording (errors).**
- **Standardized data collecting forms?**
- **No geo-reference maps of palms.**





Farmer Participation in the IPM Program

- **Weak participation in the management program (Socio-economic situation of farmers?). Closed farms?**
- **Lack of policy and means to encourage participation and sharing among farmers.**
- **Weak extension programs restricting the feedback mechanism to improve programs.**
- **Farmers aren't aware of risks and economic impact on production and productivity of date palms.**
- **In such cases, communication between extension agencies and farm owners does not reach farm workers.**





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Role of Cooperatives, NGOs, Private Sector etc

- Limited cooperatives, NGOs, Private sector companies supporting programs (far distributed).
- Coordination between government/public agencies working in this field with the NGOs/Private sector and cooperatives.
- No assessment of their participation.





Capacity Building

- **Several capacity building programs on RPW-IPM are being implanted.**
- **Not sufficient (lack of resources and funds?) and often do not reach workers, farmers etc.**
- **Continuous updates are not made available to stakeholders at regular intervals.**
- **No structured capacity building programs for different categories of staff (workers, farmers, technicians).**





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Communication and Extension Service

- Are currently weak .
- Some RPW dedicated telephone lines exist to transmit alerts.
- Lack of tailor made extension programs.





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National, Regional and International Cooperation / Networking

- **Little cooperation and networking at the National level.**
- **No Regional and International cooperation and networking.**





Recommendations - Detection

- **Create awareness among farmers and other stakeholders about the seriousness of the RPW issue.**
- **Develop a protocol for visual inspection in a simple and easy to understand languages of the farmer and other support staff.**
- **Urgent need to develop a quick and reliable, cost effective, and easy to handle early detection device for RPW.**
- **Carry out a risk assessment of the area adopting visual observation and pheromone traps.**





Recommendations - RPW-IPM

- **Develop good agronomic practices that limit RPW attack.**
- **Preventive measures including sanitation, wounds treatment, removal of neglected orchards, pheromone trapping, and insecticide applications via spray and injection should be practiced.**
- **Explore potential indigenous strains of entomopathogenic nematodes and fungi and develop an efficient delivery system.**
- **Develop a RPW-IPM programs and ensure farmers/stakeholder participation.**





Recommendations - Trapping

- **Mass trapping to be taken up by lead / trained farmers.**
- **Introduce attract and kill strategy in mass trapping programs.**
- **Evaluate the dry trap using electro-magnetic technology.**





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Recommendations - Quarantine

- **Develop regulation manuals with clear requirements for import, movement and nursery certification.**
- **Support the establishment of tissue culture laboratories for the production and supply of RPW free planting material.**
- **Train Plant Quarantine Staff and other law enforcement authorities.**





Recommendations - control

- Preventive insecticide treatments based on infestation foci and trap capture data.
- Develop a protocol for the rationale use of preventive insecticide applications.
- Test a range of insecticides and register them against RPW.
- Before authorizing injection for preventive treatments in date palms, trials on residue analysis should be carried out.
- Test Natural pesticides after knowing product composition details.





Recommendations - Removal

- **Removal and the disposal of infested palms' procedures should be developed.**
- **It is recommended to assess and dispose of such palms in the site itself.**
- **Explore the possibility of onsite incineration/small shredders of the removed palms through mobile incinerating trucks/mobile shredding machines.**





Recommendations – Data Management

- **Develop a GIS and spatial data base to be used operationally by countries.**
- **Managing mass trapping through the GIS with RFID (Bar coding) of traps.**
- **Use a remote sensing imagery to geo-reference palm trees in countries to be used as primary base map in the GIS.**
- **Develop a user friendly mobile application for reporting, data collection and transmission.**





Recommendations - Extension

- **Strengthen extension programs, activities, knowledge sharing mechanisms, communications, and farmers' organizations.**
- **Establish defined coordination mechanisms with NGO's, private sector, and cooperatives to make the program more effective.**
- **Introduce participatory approach (Farmers Field School) for farmers and farm workers to empower them with knowledge and field practices.**
- **Use of social media to expedite transmission of information.**
- **Strengthen cooperation among institutions at the National level and initiate programs of cooperation at the Regional and International level.**



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