

THE RED PALM WEEVIL, *RHYNCHOPHORUS FERRUGINEUS*, A NEW PEST THREAT IN THE CARIBBEAN: BIOLOGY AND OPTIONS FOR MANAGEMENT.

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DLVV-Curacao; ⁶USDA-APHIS-IS, Caracas**



PALMS - A PART OF OUR HERITAGE

- Palms, sand and beauty
- In the past two years sales of coconut water have more than doubled to \$60 Million
(Fortune Magazine June 14)
- Facing several threats – lethal yellowing, coconut mite, and now weevils



NEOTROPICAL PALM WEEVILS

- *Rhynchophorus cruentatus*
- *Rynchophorus palmarum*
- *Rynchophorus ferrugineus*



By - Jennifer C. Girón Duque



Rhynchophorus cruentatus - Distribution



Rhynchophorus cruentatus

- Native host – *Sabal palmetto* but it seems to attack mainly wounded or dying palms
- Occasionally a severe nursery pest of *Phoenix canariensis* in Florida (Hunsberger et al 2000)
- *Bismarckia nobilis*, *Washingtonia sp.*, *Serrenoa repens*, *P. dactylifera*, *Pritchardia sp.*, *Roystonea sp.*, *Cocos nucifera*, *Latania sp.*, *Caryota sp.*, and *Thrinax radiata*



Rhynchophorus palmarum - Distribution



Cuba, Dominica Grenada,
Guadeloupe, Martinique
Puerto Rico, St Vincent
Trinidad and Tobago

Belize, Costa Rica
El Salvador, Guatemala
Honduras, Nicaragua
Panama



Argentina, Bolivia, Brazil,
Colombia, Ecuador, French
Guiana, Guyana, Paraguay,
Peru, Surinam, Uruguay
Venezuela



Rynchophorus palmarum

- Pest Status: Only reported as a pest on palms and sugarcane GU1
- Host Plants: 35 plant species of 12 different families, but is found predominantly on *Areaceae*
- *Cocos nucifera*, *Elaeis guineensis*, *Euterpe edulis*, *Metroxylon sagu*, *Phoenix canariensis*, *Phoenix dactylifera*, *Saccharum offi cinarum*
- Vector of the nematode – *Rhadinaphelenchus cocophilus* which causes red-ring disease



Slide 7

GU1

Is it a pest or do they only rear *R palmarum* on sugarcane?

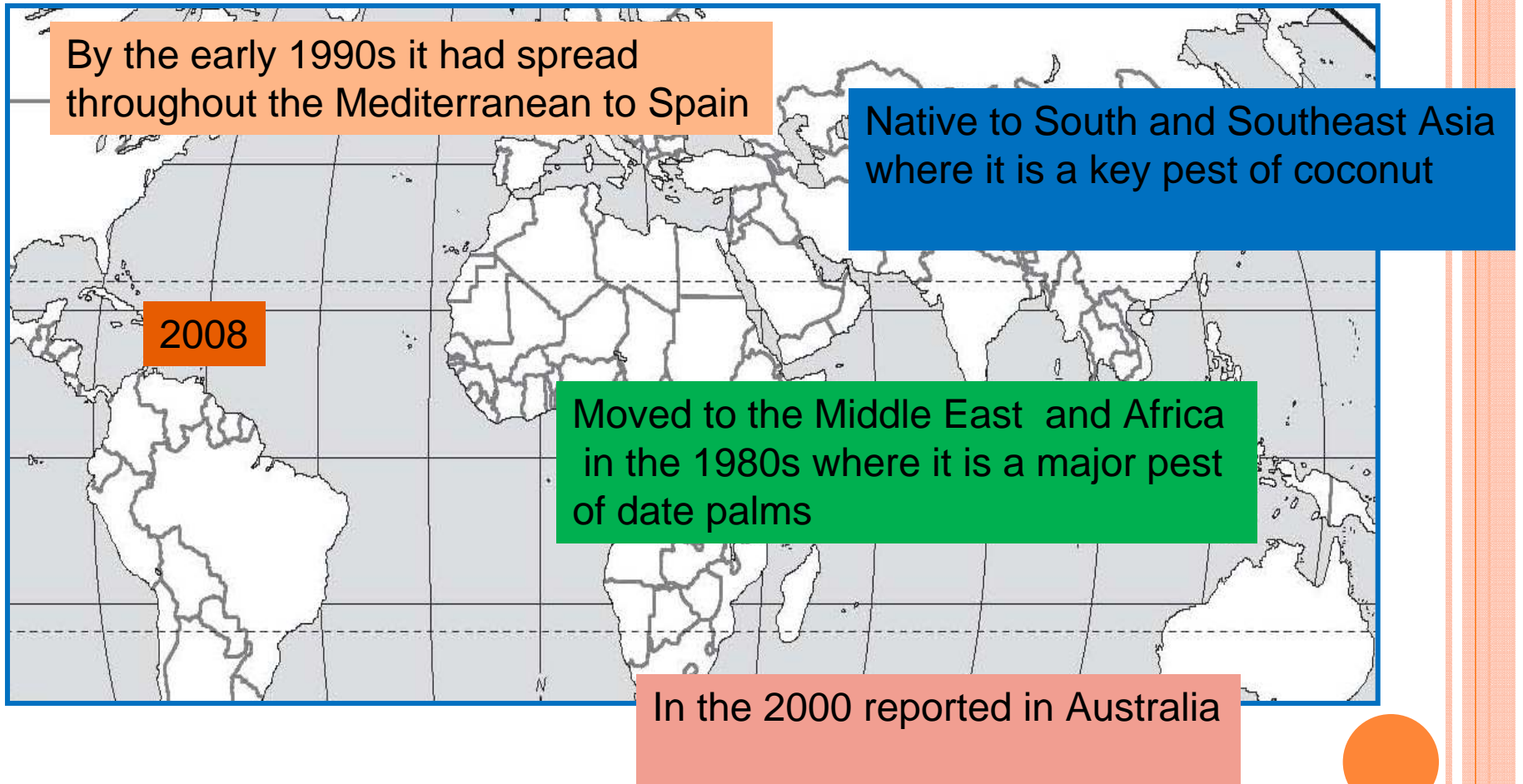
Government User, 7/12/2010

RED PALM WEEVIL

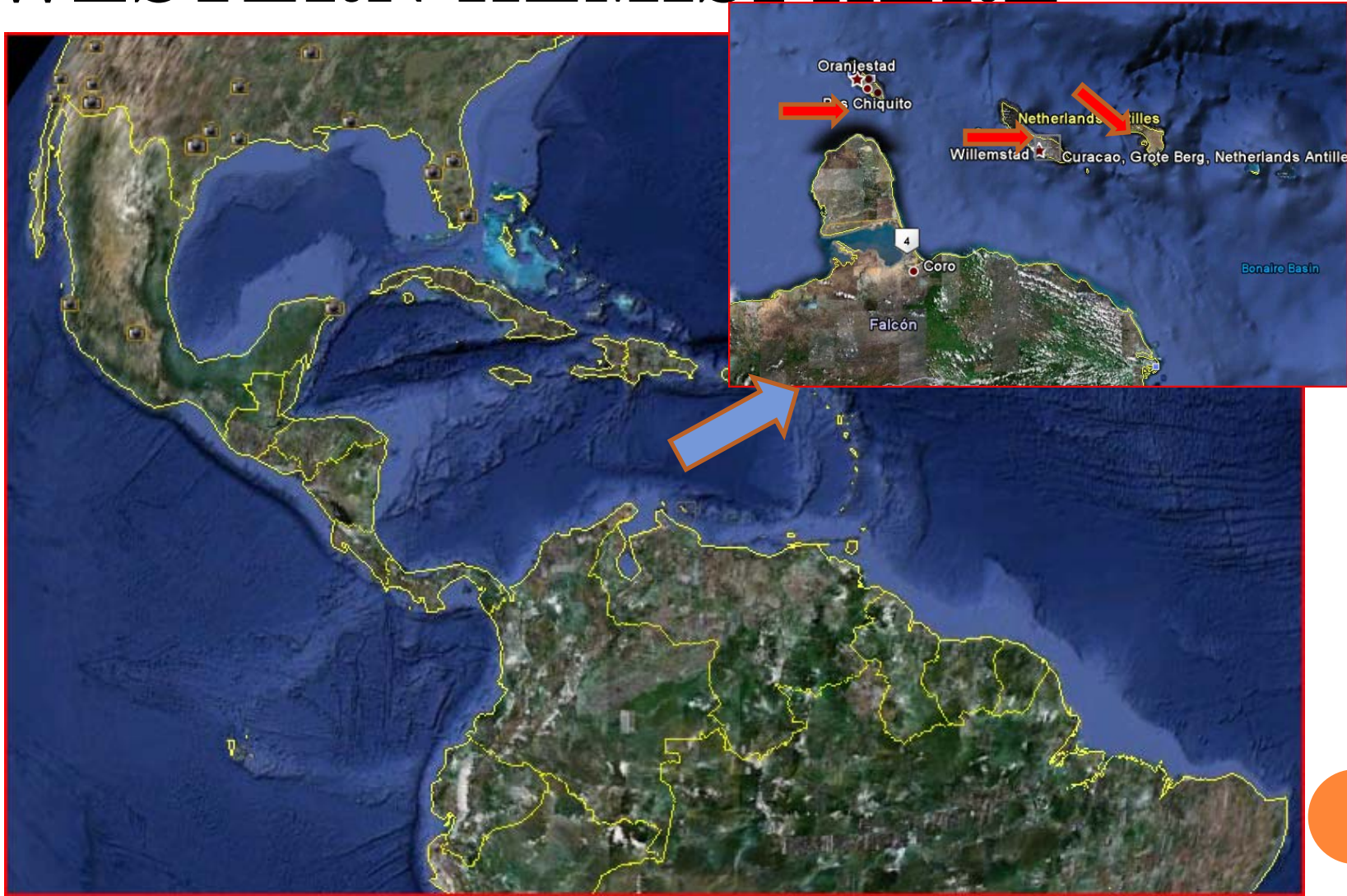
RHYNCHOPHORUS FERRUGINEUS



ORIGIN AND DISTRIBUTION



APPEARANCE IN THE WESTERN HEMISPHERE



DAMAGE IN THE CARIBBEAN



100 YEARS OF RESEARCH

- Faleiro, J.R. 2006. A review of the issues and management of the red palm weevil *Rhynchophorus ferrugineus* (Coleoptera: Rhynchophoridae) in coconut and date palm during the last one hundred years International Journal of Tropical Insect Science Vol. 26, No. 3, pp. 135–154, 2006



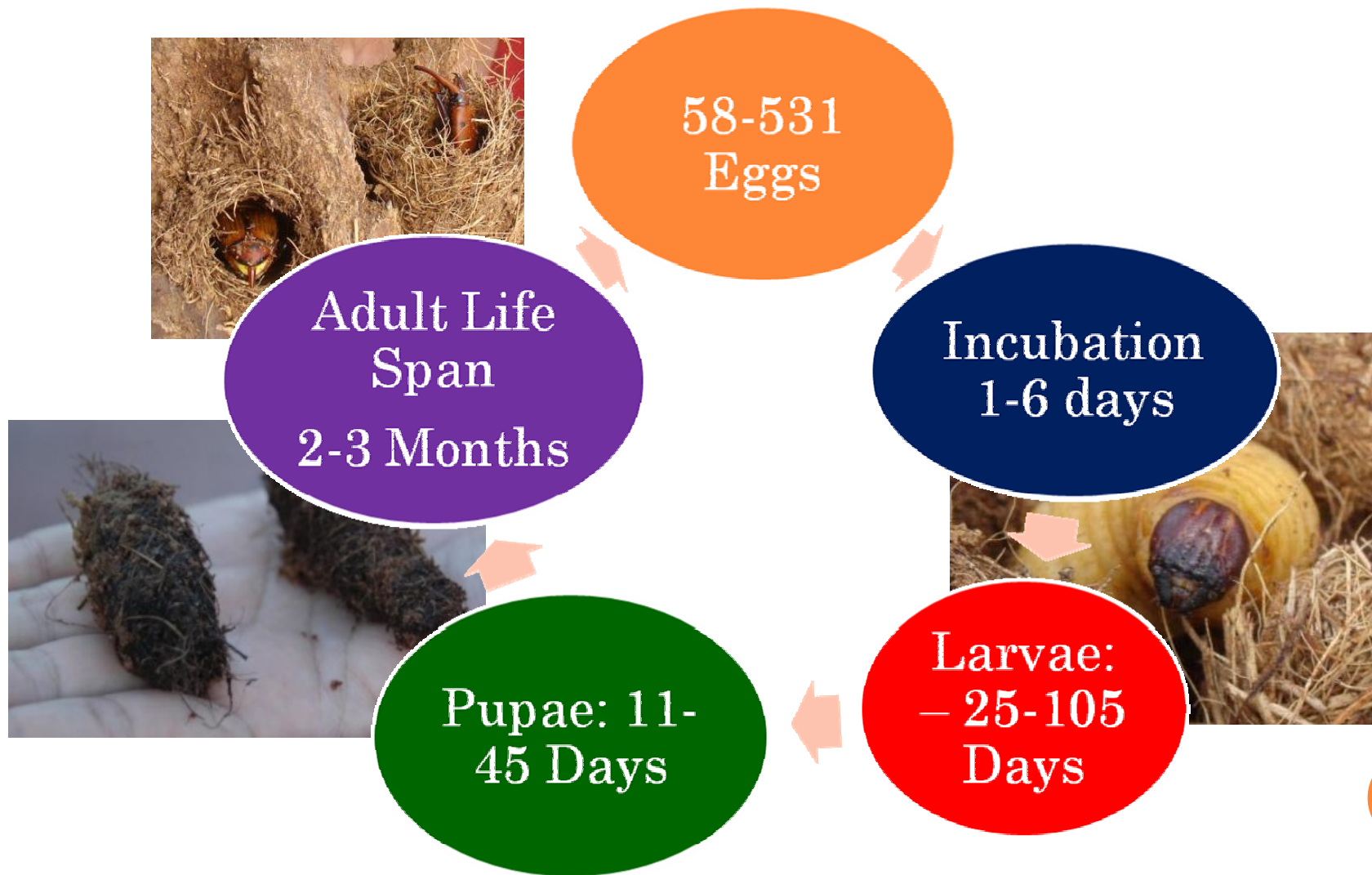
HOST PLANT RANGE

Esteban-Duran et al. (1998) reported RPW on 17 palm species

- *Areca catechu*
- *Arenga pinnata*
- *Borassus flabellifer*
- *Caryota maxima*
- *C. cumingii*
- *Cocos nucifera*
- *Corypha gebanga*
- *C. umbraculifera*
- *C. elata*
- *Elaeis guineensis*
- *Metroxylon sagu*
- *Oreodoxa regia*
- *Phoenix canariensis*
- *P. dactylifera*
- *P. sylvestris*
- *Sabal umbraculifera*
- *Washingtonia sp.*



DEVELOPMENTAL AND REPRODUCTIVE BIOLOGY - LIFE CYCLE



DEVELOPMENTAL AND REPRODUCTIVE BIOLOGY – LIFE CYCLE

- Life cycle: 45 –139 days
- No. of generations: from 3-4 to 21



MEANS OF SPREAD

- Long distance:
Ornamental trade:
Palms imported
from Egypt
- Local spread:
Adults can fly up
to 1 km per day



REGIONAL MEANS OF SPREAD

- Hitch hiking?



OPTIONS FOR CONTROL

- Integrated Pest Management - Used successfully across the globe
- RPW has been successfully managed on coconut in India using an IPM since mid 1970s
- Very successful IPM program implemented in the Middle East for date palms



COMPONENTS OF A SUCCESSFUL INTEGRATED PEST MANAGEMENT

- Early detection of infestations
- Trapping
- Sanitation
- Chemical Control
 - Preventative
 - Curative
- Biological Control
- Education and outreach



DETECTION OF EARLY STAGE INFESTATIONS

- The ability to detect early stage infestations is critical for IPM
- Recognizing damage symptoms
- Some suggested tools:
 - Acoustic detection:
 - Variety of acoustic equipment
 - Sniffer dogs



DAMAGE SYMPTOMS

- Presence of tunnels on the trunk and base of frond petiole,
- Gnawing sound due to larvae feeding
- Oozing out of thick brown fluid from the tunnels
- Appearance of frass with a typical fermented odor
- Drooping fronds/yellowing
- Pupal cases and dead adults
- Trunk may break and the crown may topple



IPM - TRAPPING

- Purpose: Used for monitoring infestations, control through adult trapping
- Tools: Pheromone traps
- Pheromone (Ferrolure^R- Chemtica Costa Rica)
 - Male produced aggregation pheromone
 - 4-methyl-5-nonanol
 - 4-methyl-5-nonanone
- Ethyl acetate
- Food Baits
 - Sugar cane, apples, palm pieces



IPM: SANITATION

- Eradication of severely infested palms
- Cutting fronds if required at a distance of 1m from the frond base
- Methods for trunk and frond disposal are critical
 - Timely
 - Burning
 - Chopping and Burying at appropriate depth)



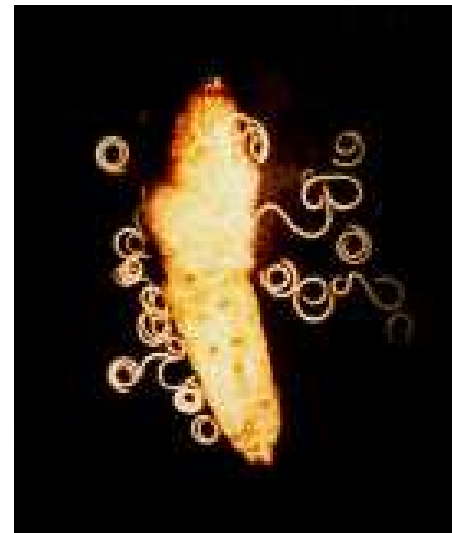
IPM: CHEMICAL CONTROL

- Use:
 - Preventative treatments
 - Curative treatments
- Pesticides
 - Contact pesticides
 - Systemic pesticides
- Public Health Concerns



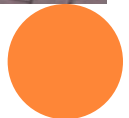
IPM – BIOLOGICAL CONTROL

- Bio-pesticides
 - Biorend^R (*S. carpocapsae*) + Chitosan (N-acetylglucosamine)
- Biological Control Agents – few options available



IPM – EDUCATION AND OUTREACH

- Audience – government officials, hotels, nurseries, homeowners
- Increasing awareness of the serious economic impact
- Preventative and/or management actions:
 - Risks of re-importing the pest
 - Stopping movement of dead/infested material to new areas
 - Proper use of pesticides



CURRENT STATUS IN CURACAO AND ARUBA

- Initial goals
 - Assess current distribution and impact of Red Palm Weevil
 - Implement a pilot monitoring/surveillance
 - Carry out critical applied research to validate relevant technologies
 - Develop pest response guidelines
 - Assist in the development and implementation of a long term management response.



HOST PLANTS ATTACKED IN CURACAO AND ARUBA

- Highly Attacked
 - *Phoenix dactylifera*
 - *Phoenix sylvestris*
- Reported
 - *Cocos nucifera*
- New Host Reports
 - *Bismarckia nobilis*
 - *Washingtonia robusta*
 - *Pritchardia pacifica*
 - *Dictyosperma album*

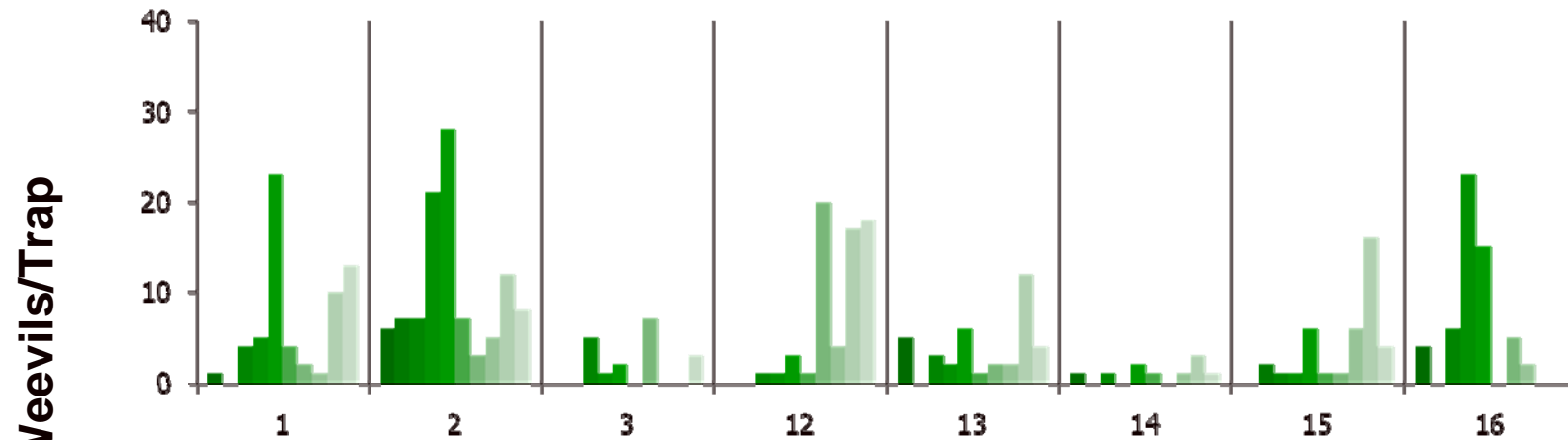
Canary Island Date Palm



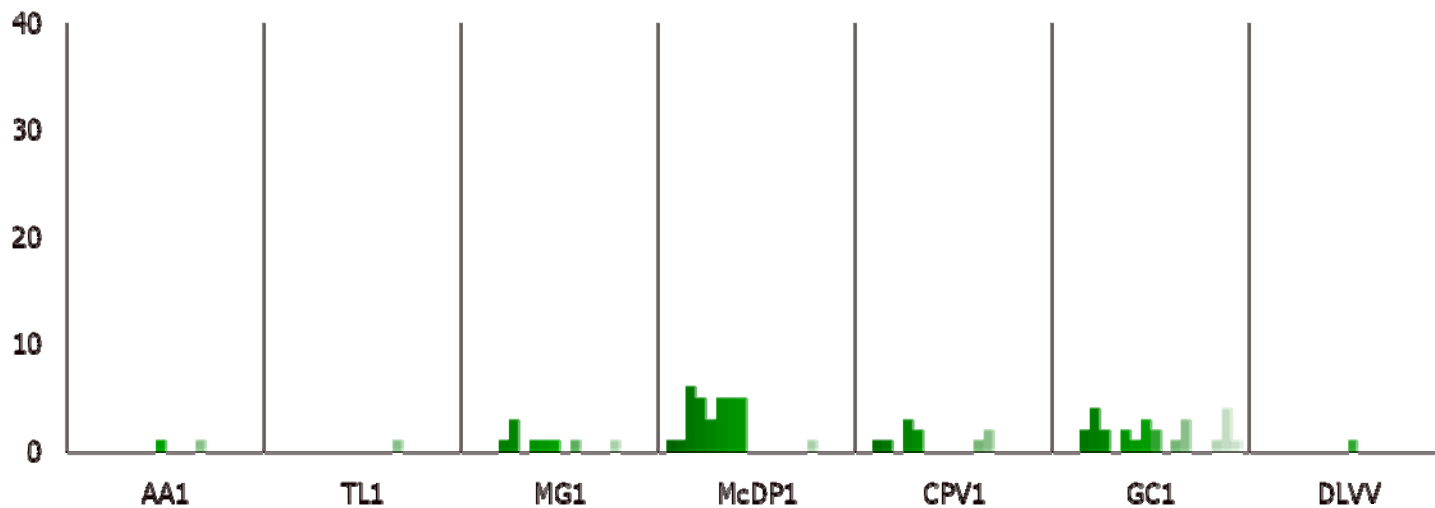
Bismarck Palm



Trap Catches East of St. Annabaai, Curacao Sept 2009-May 2010



Trap Catches Aruba Sept 2009-May 2010



RESEARCH ON ACOUSTIC DETECTION

- Assist in developing and implementing a plan of action, identifying specific collaborative activities



OTHER ACTIVITIES

- Development of pest response guidelines
(http://www.aphis.usda.gov/import_export/plants/manuals/emergency/index.shtml)
- Research on trapping methods
- Development of plan for eradication
- Partnerships with private sector



CONCLUSIONS

- The Red Palm Weevil is a serious threat to the Caribbean – A **Cooperative Regional Effort is Needed**
- Need for increased public awareness across the region
- Preparation of detailed contingency plans for the management.
- Development of appropriate legislation where absent
- The possibility of eradication of RPW in the Dutch Antilles may minimize spread in the region



ACKNOWLEDGEMENTS

USDA-APHIS-PPQ-CPHST

USDA-APHIS-GCSI

USDA-APHIS-IS

USDA-ARS-CMAVE

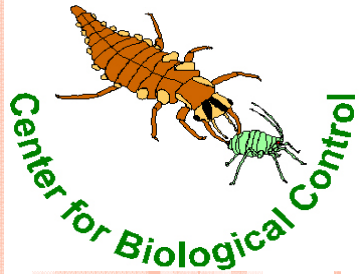
Curacao DLVV

Aruba DLVV

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APHIS Red Palm Weevil Farm Bill project,



FAMU - CESTA



THANK YOU

Questions?