



Operesen stopem CRB



UPDATE ON COCONUT RHINOCEROS BEETLE ACTIVITIES

30th October 2019



Introduction



- Coconut is a tree of life;
- Very important cash crop in Vanuatu with high production (northern province);
- Coconut industry is 2nd largest contributor to foreign exchange earning;
- Vanuatu Development Strategic Plan 2030 production targets:

a	Aleurodicus destructor / Hemiptera / coconut whitefly	Maddison P.A., 1993a	a	Oryctes centaurus / Coleoptera	Maddison P.A., 1993a
a	Aonidiella aurantii / Hemiptera / Citrus red scale	Williams & Maddison, 1990	f	Periconiella cocoes / Incertae sedis	McKenzie E.H.C., 1989
a	Aonidiella aurantii / Hemiptera / Citrus red scale	Maddison P.A., 1993a	f	Pestalotiopsis palmarum / Xylariales	McKenzie E.H.C., 1989
a	Aonidiella eremocitri / Hemiptera	Williams & Maddison, 1990	f	Pestalotiopsis palmarum / Xylariales	Johnston A., 1963b
a	Aonidiella eremocitri / Hemiptera	Maddison P.A., 1993a	f	Pestalotiopsis palmarum / Xylariales	Risbec J., 1937
a	Aspidiotus destructor / Hemiptera / cotton scale	Maddison P.A., 1993a	f	Phoma sp. / Pleosporales	Wright J., 2003
a	Aulacaspis cinnamomi tubercularis / Hemiptera	ORSTOM	f	Phytophthora palmivora / Pythiales / coconut budrot	Huguenin B., 1962a
a	Aulacaspis sumatrensis / Hemiptera	Maddison P.A., 1993a	f	Phytophthora palmivora / Pythiales / coconut budrot	McKenzie E.H.C., 1989
a	Aulacaspis sumatrensis / Hemiptera	Williams & Maddison, 1990	a	Platylecanium cocotis / Hemiptera	Maddison P.A., 1993a
f	Bipolaris incurvata / Pleosporales / Coconut leaf spot	McKenzie E.H.C., 1989	a	Platylecanium cocotis / Hemiptera	Williams & Maddison, 1990
f	Bipolaris sp. / Pleosporales	McKenzie E.H.C., 1989			
a	Brontispa longissima / Coleoptera / Coconut hispine beetle	Maddison P.A., 1983			
a	Brontispa longissima / Coleoptera / Coconut	Maddison P.A., 1993a			

Brontispa longissima / Coleoptera / Coconut
hispine beetle



Vanuatu has two beetles that attack coconut

Oryctes rhinoceros



Oryctes centaurus



Early signs of attack are the same for both beetles



Older attack symptoms are also similar



But only *O. rhinoceros* kills palms



Background information

Coconut Rhinoceros Beetle (*Oryctes rhinoceros*)

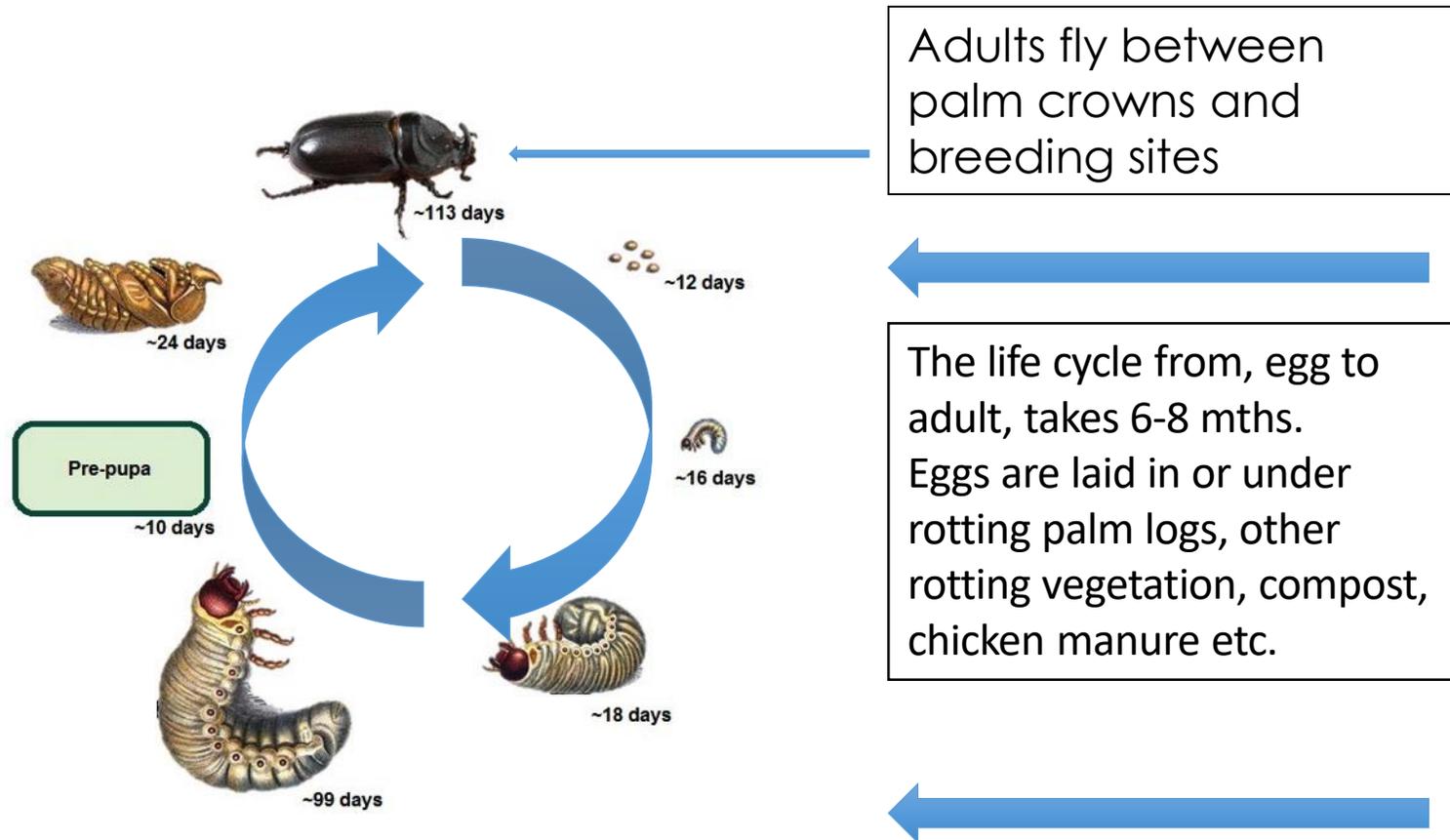
Major pest of coconut palm & other palms in tropical region;

- Destructive only at adult stage (~ live 95days); This feeding cuts soft tissue when the frond expands 3-4 weeks later;
- Adult CRB flies between palm crowns & breeding sites;
- The life cycle from, egg to adult, takes 6-8 months.
- Eggs: laid in or under rotting palm logs, other rotting vegetation, compost, chicken manure, etc.



BV pic

The life cycle of both is similar



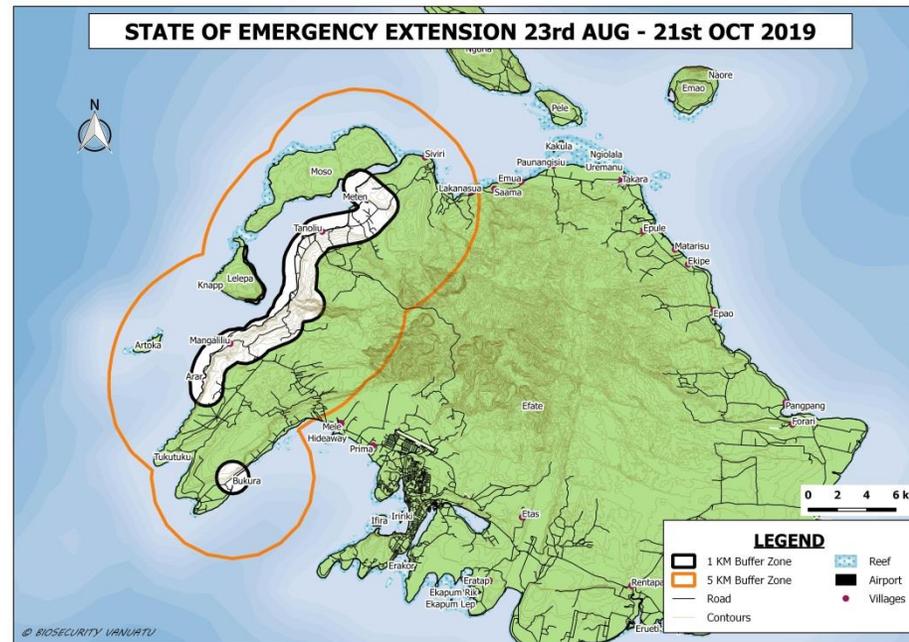
Introduction of CRB in South Pacific region

- early 1900s (1909s);
From 1st introduction into Samoa, it spreads to:
 - American Samoa in 1912,
 - Tonga in 1921,
 - Wallis and Futuna in 1931,
 - Fiji in 1953, and to Tokelau (year unknown).

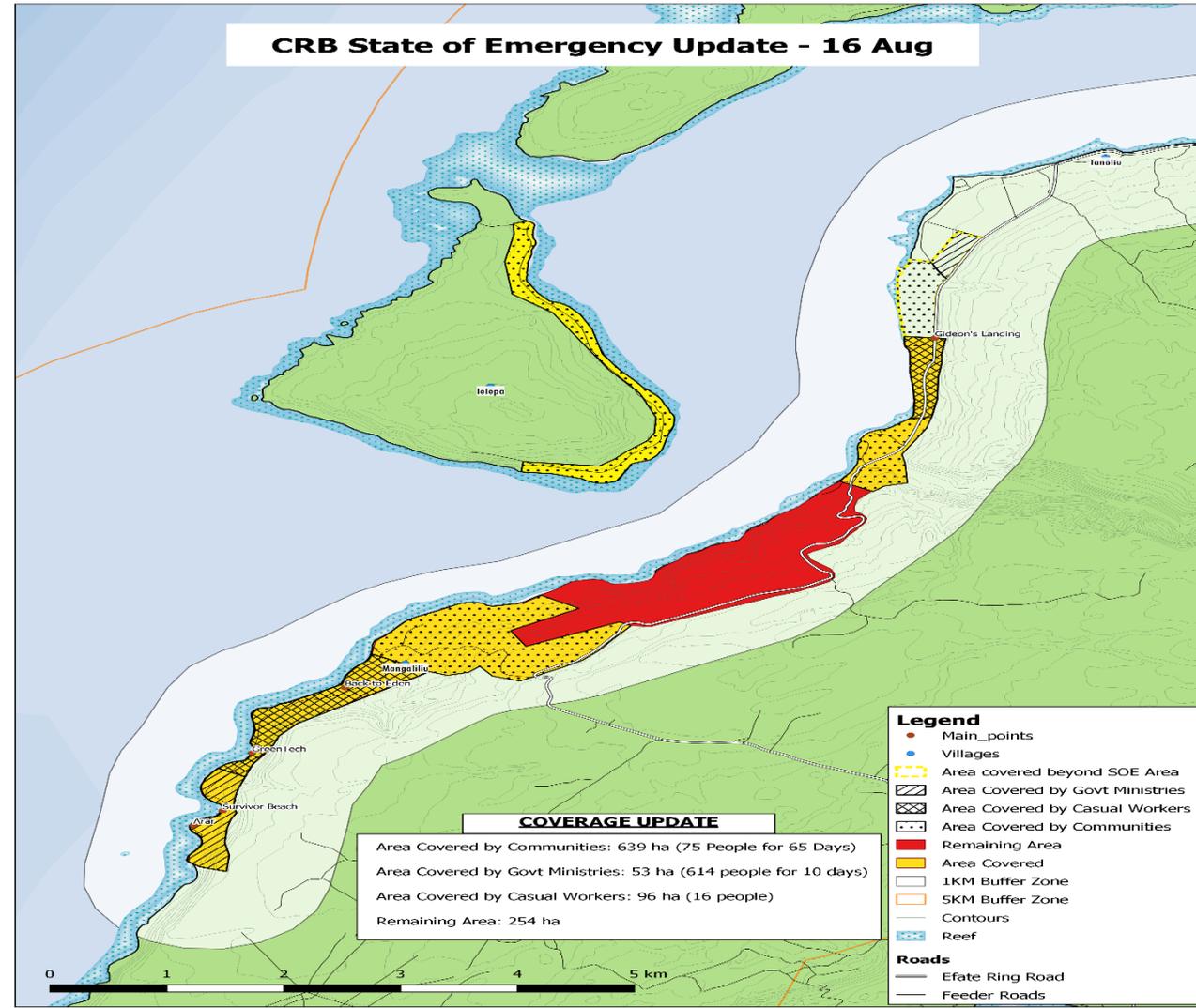
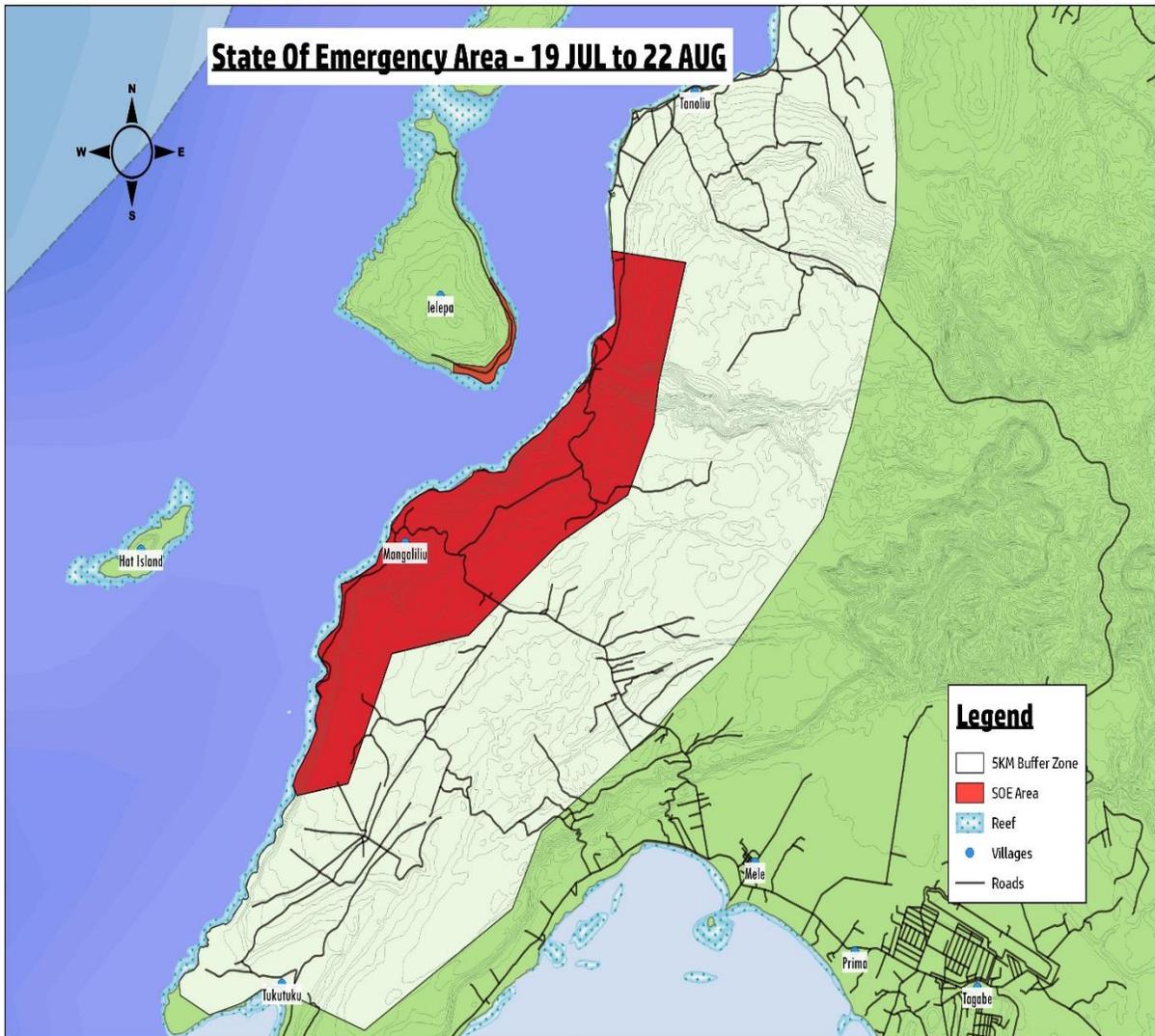
- Guam 2007, PNG 2009;
- Hawai & Palau: 2014;
- Solomon Isl: 2015,
- Vanuatu: May 20th 2019
- & New Caledonia : September 2019

State of Emergency

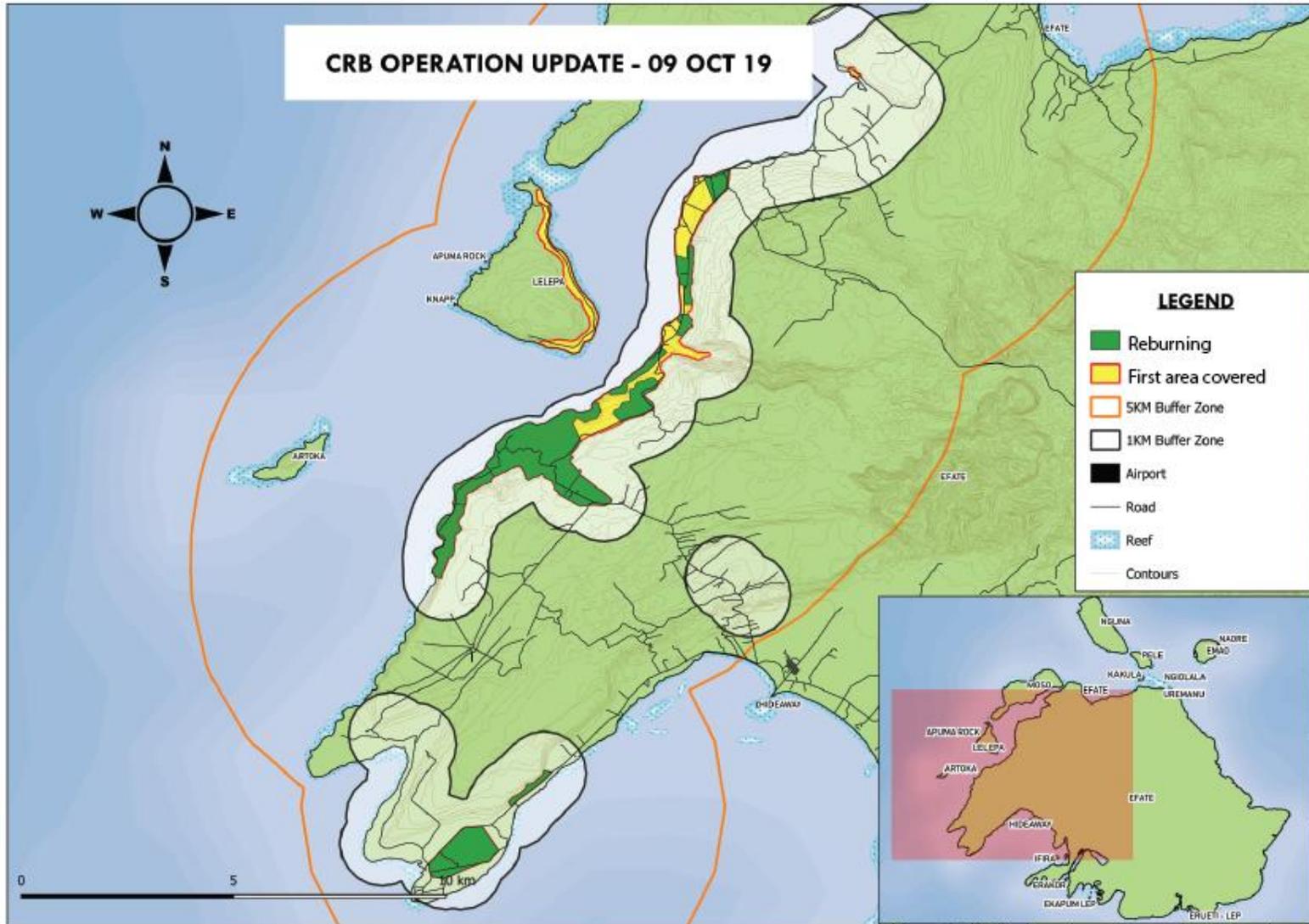
- State of Emergency Order N0.77 of 2019;
- Declaration on 19th July – 22nd August 2019; extended 23rd August – 21st October 2019;
 - Area covers Arar point from Mangaliliu to Moso landing and Lelepa Island (1st SoE); Extended beyond (
 - Restriction of CRB host materials (Coconut fruits, coconut leaves, fire wood; compost; manure) ;



SoE 19th July – 22nd August



SoE 23rd August - 21st October



Control of CRB

The primary and most effective method of control of CRB is destruction of all breeding sites: mainly rotting coconut logs but also rotting vegetation, compost, chicken manure and under cow manure.

Cut down and cut-up all dead palms before they rot



Pile up and burn everything

Management & containment (1)

Physical control

- Sanitation (destruction and burning of CRB breeding sites)
 - involvement of casuals; government and non-government agencies; Red cross, Vanuatu Force VMF; community of affected areas;
- Application of traps (gill nets; PVC traps, light traps, artificial breeding sites)
- Control movement of host planting materials;



Good practices to reduce CRB spreading

Check for symptoms on leaves, look for grubs, sanitation – cover with Gill nets



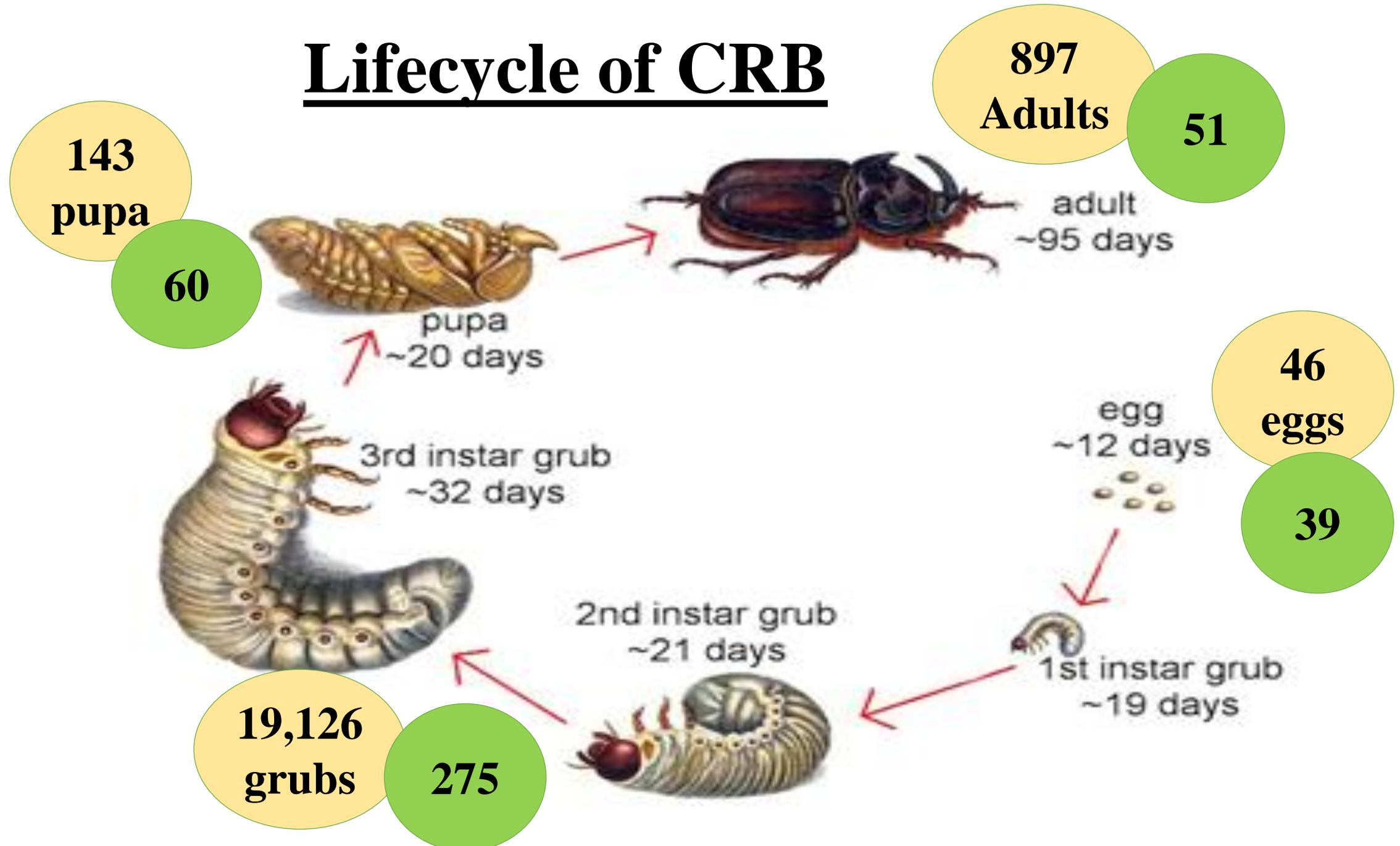
STOP movement of following items



Number of breeding sites (burning & re-burning)

Possible breeding sites	Numbers
Breeding sites destroy (burning at affected areas)	11,742
Breeding sites destroy (Re-burning at affected areas)	357

Lifecycle of CRB



Management & containment (2)

Biological control

- Fungus (*Metharizium*);
- Virus (*Oryctes nudivirus*: OrNV) - activity done in the lab container for the next two years onwards;
- Both agents above are susceptible to Vanuatu CRB (Biotype S);
- Used in many pacific countries (Samoa, Fiji & PNG)

Actions taken until end of SoE

- Continuous sanitation and eradication measures (Touktouk Bukura & Meten & Malafau);
- On-going containment measures (inspection at the check points);
- Release of virus to reduce CRB population (today);
- Fumigation of any CRB host plant materials @ Magaliliu main market & inspection at selected locations of affected areas;

Future plan:

- Sniffing dogs;
- Population modelling
- Chemical control to intergrade in fungus sites;

Recommendations

- Continuous assistance (resources) to support Biosecurity Plant Health activities;
- On-going community participation through surveillance & monitoring awareness campaign at affected areas & also reports at non affected areas;
- Re-structuring BV to establish an Emergency response unit for any future animal & plant threats e.g. presence of African Swine fever at Timor;
- Speed up – Biosecurity Bill (internal quarantine measures within islands);

Challenges

- 1st time to deal with a exotic agricultural pest as a disaster (process to carry out delimiting survey, understand the biology of the pest...);
- Importance of surveillance: Biosecurity Plant Health is lack of fund and resource (vehicle & staff);
- Movement of goods (carrier of CRB spread) from affected areas to non-affected areas;
- Financial support;
- Biosecurity Bill.

Dead palms in Fiji before *Oryctes Nudivirus* (*OrNV*) was introduced



(Source: Bedford. G.O., 2013 Annu Rev Entomol
58: 353–72)

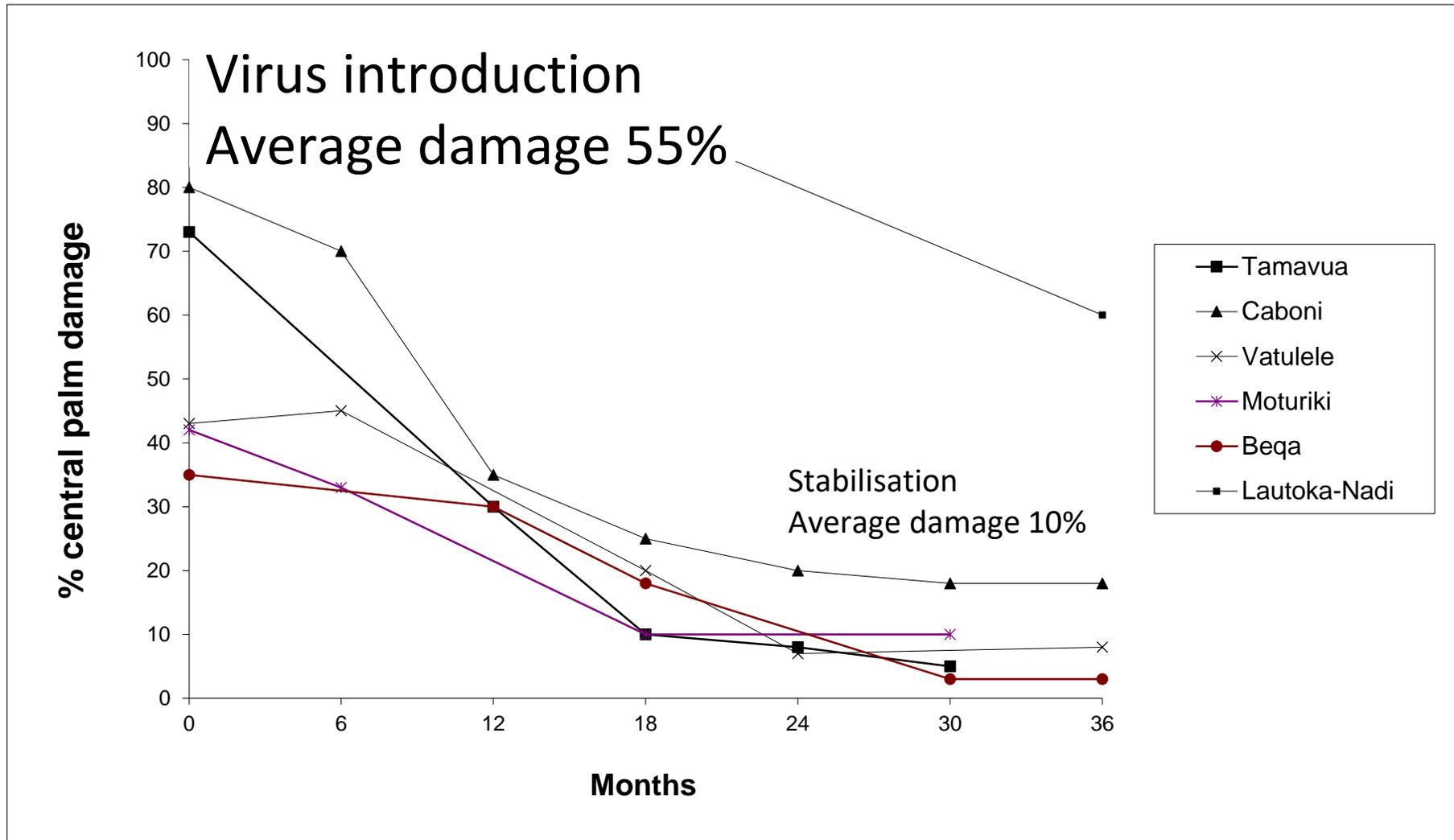
Before and after virus release - Fiji



(From Bedford 2013)



Damage reduction after virus introduction – Fiji 1970s



(Adapted from Bedford 1981)

Healthy palms free of CRB in Samoa in 2013: *OrNV* and effective plantation sanitation helped contribute to the eradication



(Source: Trevor Jackson, Principal Scientist, AgResearch, Lincoln, Christchurch, New Zealand)

Our n1 enemy – CRB (*Oryctes rhinoceros*)



Method of attack

- The adult beetle flies to the centre of the crown of the palm.
- It then crawls down the fronds near the central growing spike and, using its front legs, digs inwards to feed on the sap of the central young soft fast growing tissues (cabbage).
- This feeding cuts the young tightly folded leaflets showing up as a typical notch when the frond expands 3-4 weeks later.