Improved traps for the coconut rhinoceros beetle, *Oryctes rhinoceros*

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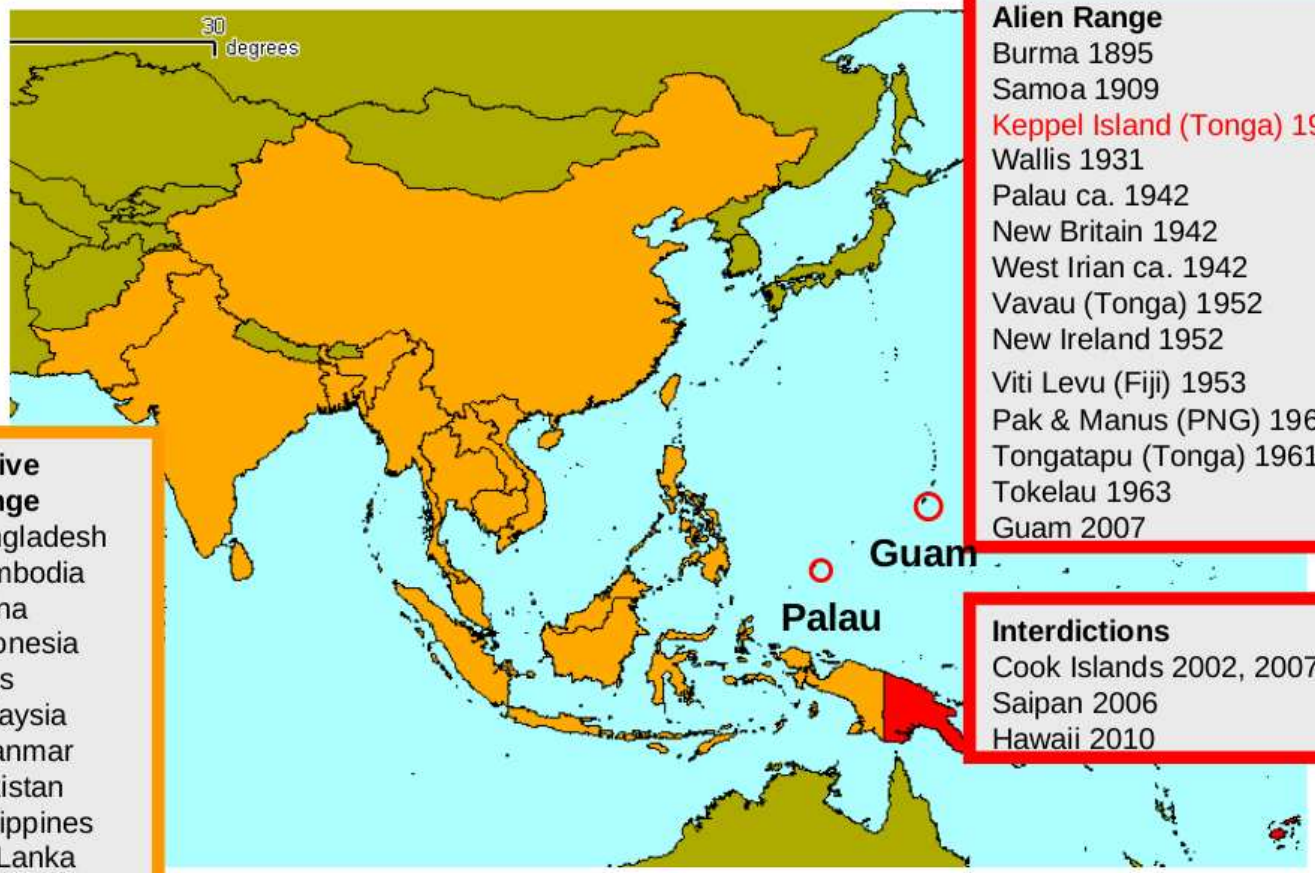
Overview

Coconut rhinoceros beetle, *Oryctes rhinoceros*

Oryctes rhinoceros Distribution



Native Range
Bangladesh
Cambodia
China
Indonesia
Laos
Malaysia
Myanmar
Pakistan
Philippines
Sri Lanka
Taiwan
Thailand
Vietnam

Alien Range
Burma 1895
Samoa 1909
Keppel Island (Tonga) 1921
Wallis 1931
Palau ca. 1942
New Britain 1942
West Irian ca. 1942
Vavau (Tonga) 1952
New Ireland 1952
Viti Levu (Fiji) 1953
Pak & Manus (PNG) 1960
Tongatapu (Tonga) 1961
Tokelau 1963
Guam 2007

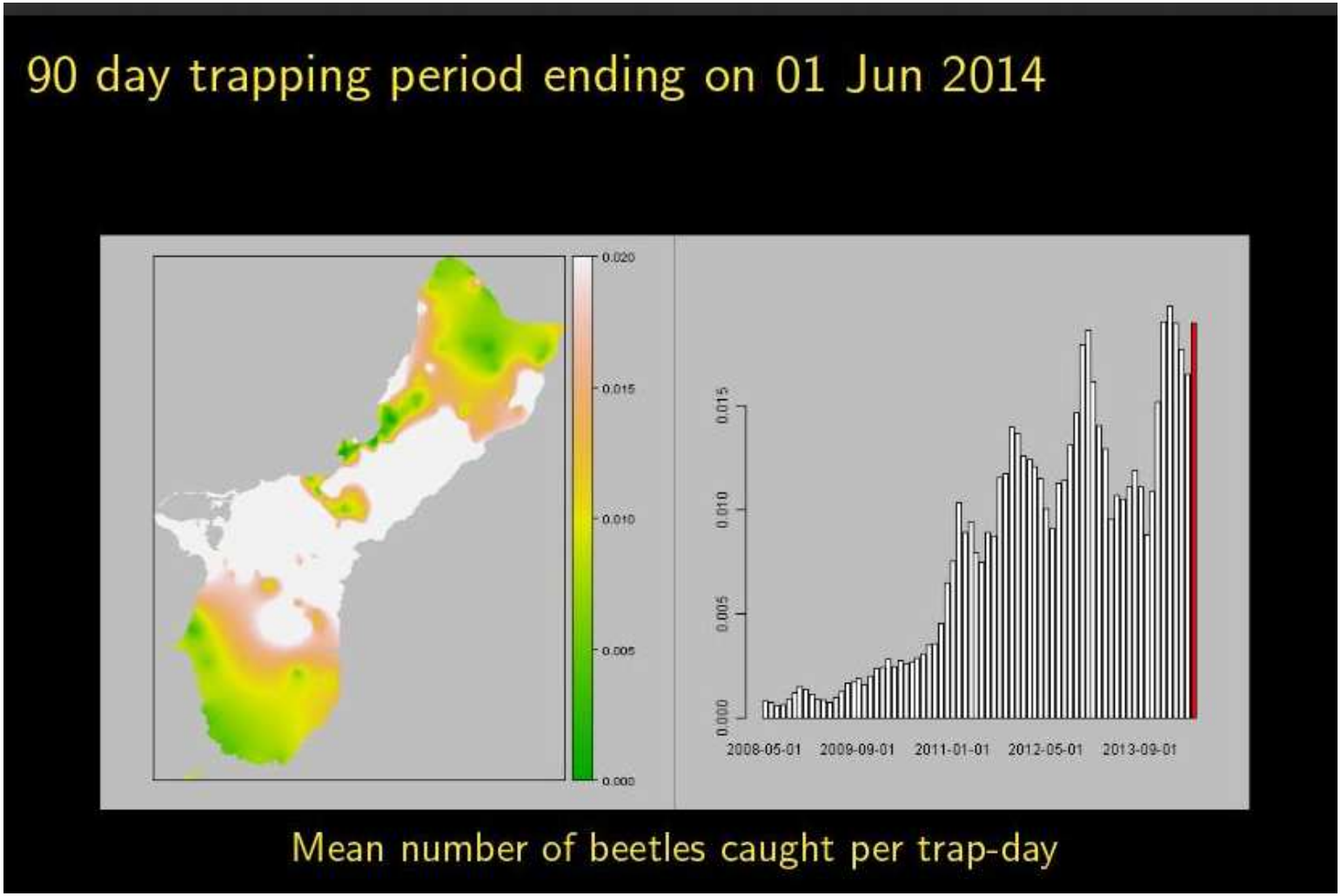
Interdictions
Cook Islands 2002, 2007
Saipan 2006
Hawaii 2010

Coconut rhinoceros beetle damage

Coconut rhinoceros beetle grubs

Vaned bucket trap

Vaned bucket trap



Ultraviolet light emitting diodes (UVLEDs)

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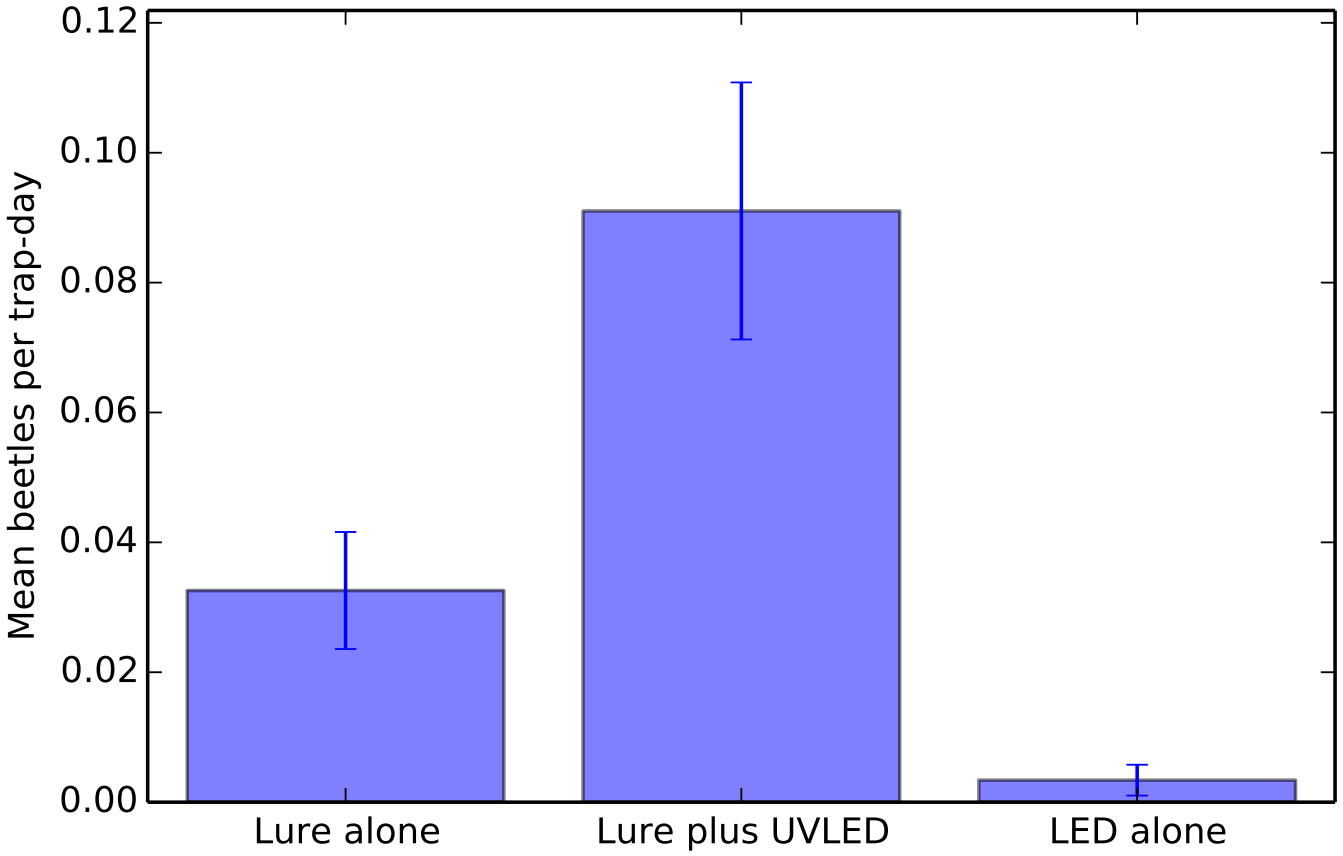


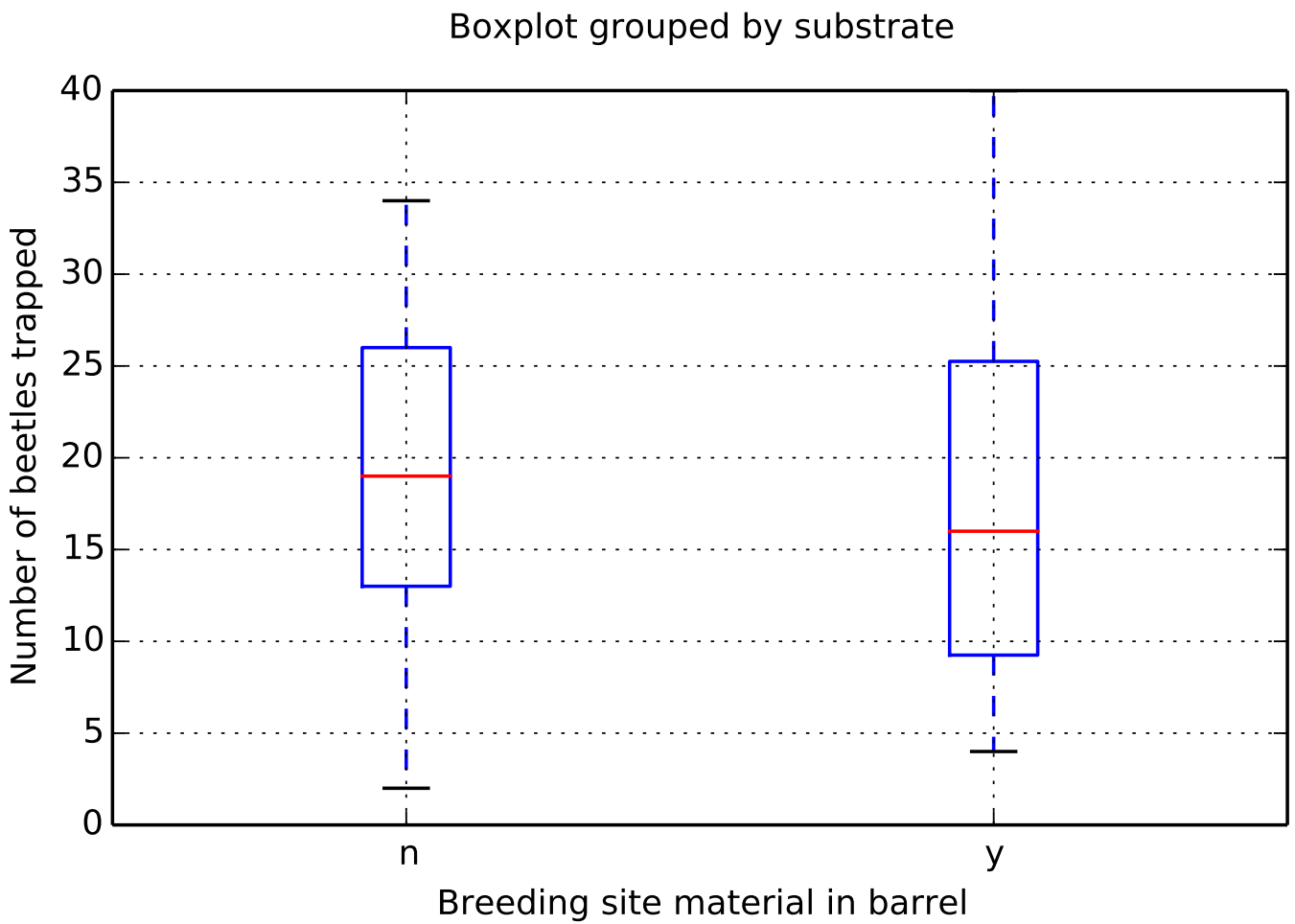
Pan traps

Pan traps

Pan traps

Pan traps catch 16X as many rhino beetles as surrounding vaned bucket pheromone traps

Pan traps - with/without substrate in barrel



Number of beetles caught per trap between 2014-07-22 and 2014-10-10.

Evolution of CRB Pheromone Traps

Fish Net Traps

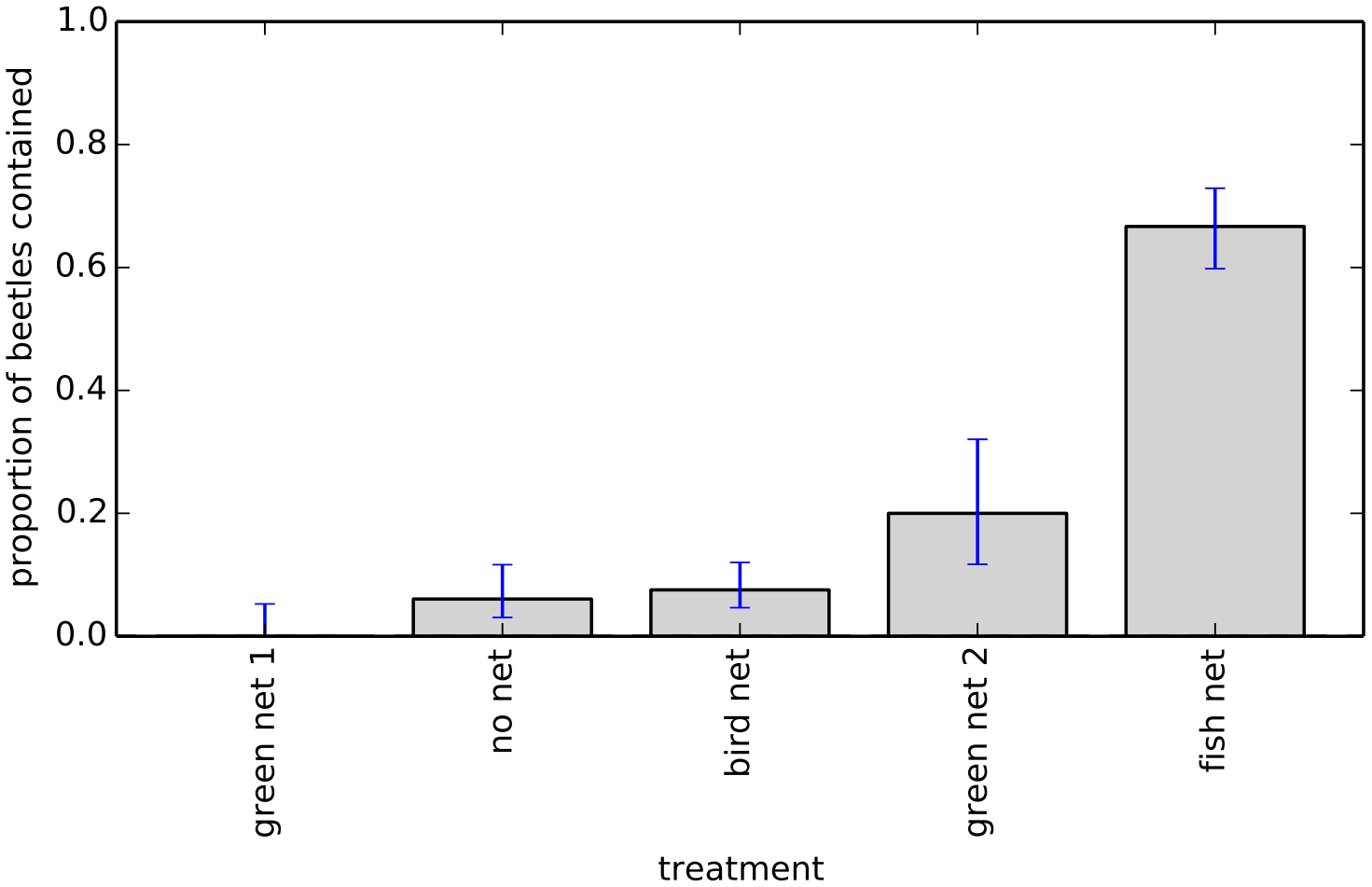
Chipped breeding site material: 0.52 CRB trapped per day
26X more attractive than standard pheromone traps

Fresh, unchipped green waste (pandanus, bamboo, breadfruit): 0.57 CRB trapped per day
29X more attractive than standard pheromone traps

Fish Net Traps

Fish Net Traps

Fish Net Traps



Mark-Release-Recapture

1. Trapped beetles are fed and allowed to rest for one week
2. Beetles which pass a laboratory flight test are marked with a number
3. Marked beetles are released at the center of 31 pan traps spaced 100m apart
4. About 20% of beetles have been recaptured
5. If wild beetles behave the same as marked beetles, we can infer that pan traps catch about 20% of the wild population

Mark-Release-Recapture

Trap	**Relative attractiveness**	**Proportion of population trapped**
Standard pheromone trap	1X	1%
Standard pheromone trap + UVLED	3X	4%
Pan trap	16X	20%
Fish net	26X	33%

Conclusions

1. Mass trapping using standard vaned-bucket pheromone traps did not result in population suppression. These traps catch only about 1% of the adult population.
2. Our best pheromone trap is a pan trap equiipped with cone and UVLED. It catches about 16X more rhino beetles per day than our standard vaned bucket traps.
3. Addition of breeding site material to the barrels did not increase trap catch.
4. Covering breeding sites with fish netting may be effective for population suppression: traps adults attracted to the pile and prevents emergence of adults from within the pile. Netted piles catch more than 25X more rhino beetles per day than standard pheromone traps.