

A virus-tolerant haplotype of the coconut rhinoceros beetle invades the Pacific region

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The coconut rhinoceros beetle (CRB; *Oryctes rhinoceros*) is a major pest of coconut and oil palm, but the discovery and release of *Oryctes rhinoceros* nudivirus (OrNV) in the 1960s and 70s suppressed the pest such that no new invasions of uninfested islands by CRB were reported for over 30 years following implementation of the biocontrol programme. Unexpectedly, a highly damaging outbreak was reported from Guam (2007) that was unable to be controlled by commonly used biocontrol isolates of OrNV. Subsequently, new invasions were also reported from Port Moresby, Papua New Guinea (2009); O'ahu, Hawai'i (2013); and Honiara, Solomon Islands (2015). We identified that all of these new outbreaks were caused by a previously unrecognized haplotype, CRB-G, which appears to be tolerant to OrNV. PCR analysis shows that OrNV is generally present at high incidence in established populations of CRB, but is absent from the invasive CRB-G populations. CRB-G from Guam was not susceptible to OrNV infection by oral delivery, but injection of the virus did cause mortality. Further genetic analysis shows that Pacific populations of CRB can be divided into a number of clades that coincide with the endemic and invasive history of the beetle. Analysis suggests that CRB-G originated in Asia, though the precise location remains to be discovered.

As a result of the new outbreaks, *Oryctes rhinoceros* was again recognised as a severe pest threat to the Pacific region during the September 2015 Pacific Plant Protection Organisation / Regional Technical Meeting for Plant Protection in Nadi, Fiji. The meeting recommended that the Pacific Community, Land Resource Division (SPC-LRD) lead a co-ordinated effort to address the problem. Subsequently, SPC-LRD has made CRB-G management a priority and requested specialist assistance for help in containment and eradication of the pest. Since that time the beetle has spread with severe damage more evident within infested nations.

Under the New Zealand Aid Programme, AgResearch is working with SPC-LRD and other partners in promoting development of a Pacific-wide CRB-G Action Group with participation from the United Nations Food and Agriculture Organization (FAO), United States of America Department of Agriculture (USDA) and Australian Centre for International Agricultural Research (ACIAR). The project remains focussed on the urgently required actions for containment of CRB-G within the South Western Pacific, while building the coalition for control across the whole Pacific and Asia. In this project AgResearch will: 1) work with SPC-LRD to prevent new CRB-G invasions into unaffected Pacific Island countries; 2) assist with development of effective methods for control of CRB-G in PNG and Solomon Islands; and 3) assist SPC-LRD to develop a regionally co-ordinated response to the problem.