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“Bridging the gap between increasing knowledge and decreasing resources”

Viruses in Orphan Crops of the Tropics and their Discovery

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Abstract

The project “adapting clonally propagated crops to climatic and commercial change” of the International Network of Edible Aroids (INEA) consolidates different researchers and institutes from around the world to work on the genetic improvement of Taro (*Colocasia esculenta*) and to specifically address tolerance / resistance against abiotic stress, mainly drought and on *Phytophthora colocasiae*, Taro leaf blight, a real threat to Taro cultivation. The centre of Taro origin and use is in the South Pacific, the main breeding activities are on Fiji and Papua New Guinea islands and from there lines are sent for adaptation trials to partners in South America and Africa. The exchange of germplasm however must ensure freedom of pathogens to prevent inadvertent introduction of new pests and diseases. The task of the DSMZ Plant Virus Department is to identify viral pathogens in Taro and to subsequently develop diagnostic tests which permit detection of viruses prior to shipment across continents. By use of transcriptome sequencing of RNA samples from Taro we were able to detect two hitherto undescribed viruses from the genera Nucleorhabdovirus and Tenuivirus as well as a number of known viruses. The entire genomes of the viruses were reconstructed and molecular as well as serological tests were developed. Currently these tests are validated for their routine applicability. In addition, a plant hopper transmitted rhabdovirus was found in several plants with severely deformed leaves and suspicious for “Bobone” disease, a very serious disease with a so far unclear viral aetiology. The “Bobone” disease is endemic only in the Solomon Islands and Papua New Guinea and its occurrence prevents exchange of material from those islands. Its symptomatology is similar to a deadly Taro disease, “Alomae” and hence the elucidation of the aetiology and powerful detection methods would present a major step towards a facilitation of the international exchange of Taro germplasm and breeding materials. The INEA Taro virus project and the progress made on the aetiology of the diseases will be reported.

Keywords: Deep sequencing, diagnostics development, nucleorhabdovirus, orphan crops