Aulacaspis yasumatsui on *Cycas micronesica* Growing Outside the Conservation Plots on Tinian

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The most recent version of this document may be downloaded from `https://github.com/aubreymoore/Tinian-cycad-images/raw/main/report/tinian_cycad_images.pdf`.

All data and code used in this report are available in a public GitHub repository at `https://github.com/aubreymoore/Tinian-cycad-images`.

1 Introduction

Ken Puliafico very kindly shared 81 high quality close-up images of *Cycas micronesica* growing on Tinian outside the conservation plots. These were recorded using a Google Pixel 3a cell phone. Some of the images clearly indicated CAS infestation. Images were used to generate an interactive web map to facilitate visualization.

2 Methods

All data processing was performed using free, open-source software.

Data were prepared using Python 3 in a Jupyter Notebook which performed the following steps.

- Latitude, longitude and time stamp were extracted from each image file.

- Multiple images taken at each unique location. A folder was created for each unique location and it was populated with images from that location.

- All images in the above folders were examined for presence of cycad aulacaspis scale and an examplar image for the location was selected. This step was performed manually.

- Data for each unique location were stored in a CSV file which was subsequently used for generating a web map.

An interactive web map was prepared using QGIS 3.22. The QGIS project file is available in the GitHub repository.

Figure 1: This image of *Cycas micronsesica* leaflets infested with CAS was taken by Ken Puliafico on Mount Lasu, Tinian on July 25 2021. It is remarkable because large numbers of scale crawlers are clearly visible.
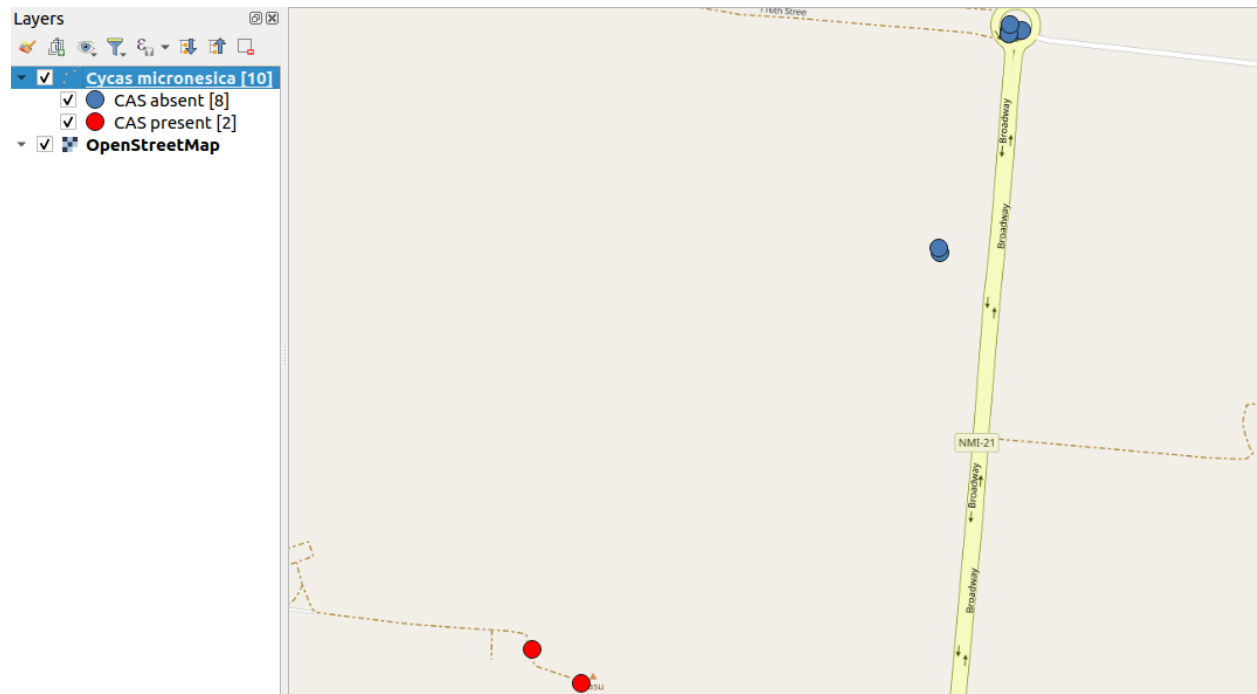
3 Results

Figure 2: Map showing 3 clusters of *Cycas micronesica* plants. Images plants in the most southern cluster indicate CAS infestation.
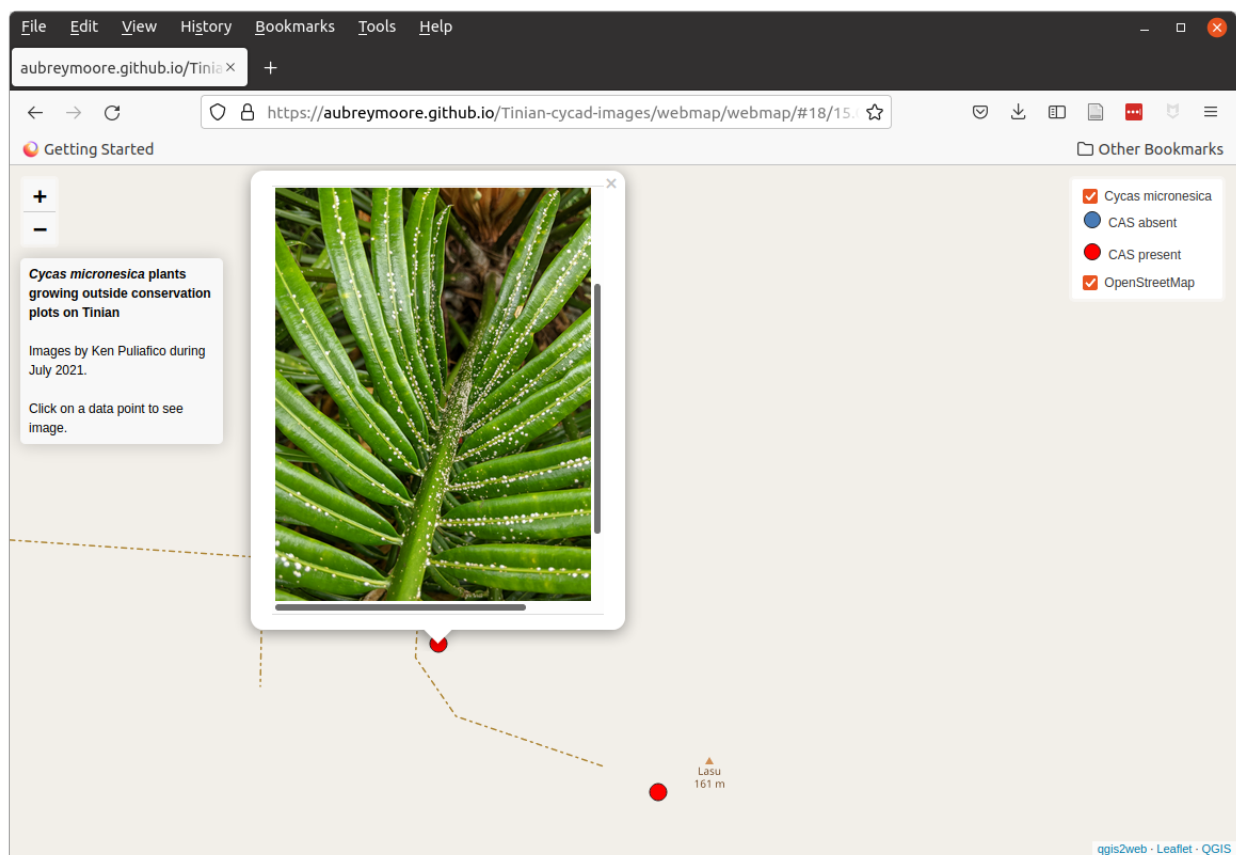
Figure 3: Interactive web map of *Cycas micronesica* locations and images. Publicly available at https://aubreymoore.github.io/Tinian-cycad-images/webmap/webmap/