The distribution of *Solenopsis papuana* in the Waiʻanae & Koʻolau Mountains

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Objective: To assess the prevalence and relative density of *Solenopsis papuana* in high-value natural areas in the Koʻolau and Waiʻanae Mountains.

Background:

- The invasive ant, *Solenopsis papuana,* was first recorded in Hawaiʻi in 1967.

- It can disperse to other locations via mating flights, and appears to be widespread in the mountains of Oʻahu.

- It has been hypothesized to negatively impact native arthropods in mesic to wet forests, but ecological effects are almost completely unstudied.

Photo: April Nobile, www.AntWeb.org.

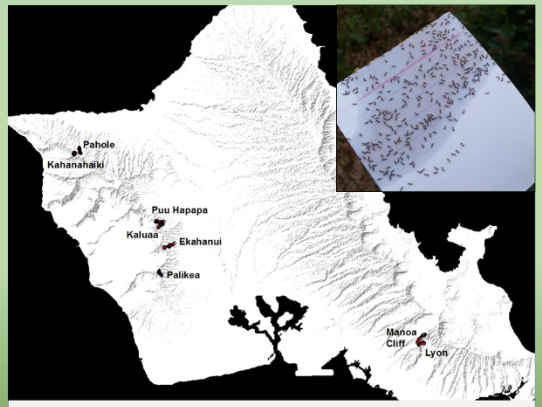

Figure 1: The eight survey locations on the island of Oʻahu, with an example of a peanut butter bait card that detected *S. papuana*.

Methods:

- Ants have been baited with peanut butter cards in areas supporting native vegetation at eight locations to date (Figure 1). 85-401 cards were placed at each location.

- To investigate fine-scale ant densities, and test methods for control, four 10x10 m plots were installed at Lyon Arboretum. After an hour, ant numbers were counted at peanut butter cards placed every 1.25 m (n=81 monitoring locations per plot).

Results:

- We observed a total of 1,424 survey points at the eight locations. Across all locations, 50% of all survey points detected *S. papuana*, 43% had no ants, and 13 other ant species were found at the remaining 7% (Figure 2).

- Incidence of *S. papuana* varied among locations from 12% to 82% of survey points (Figure 3).

- *S. papuana* was found from 198 to 884 m in elevation. The highest elevation monitored was 914 m.

- The Lyon Arboretum plots revealed that *S. papuana* can reach very high densities where it occurs (Figure 4).

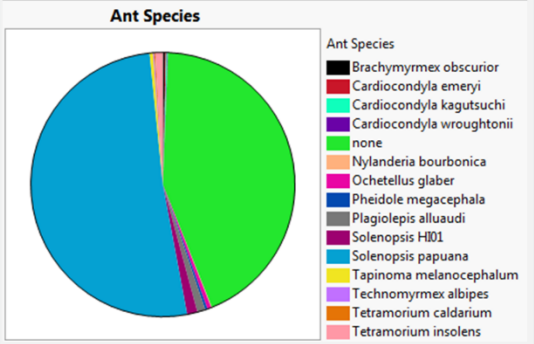

Figure 2: Composition of ant species among all survey points to date. A total of 14 species were found in our sampling areas.

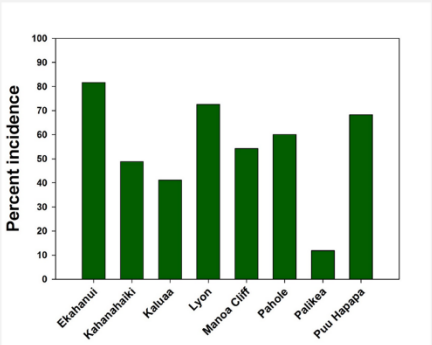

Figure 3: The incidence rate of *S. papuana* at the eight sampling locations.

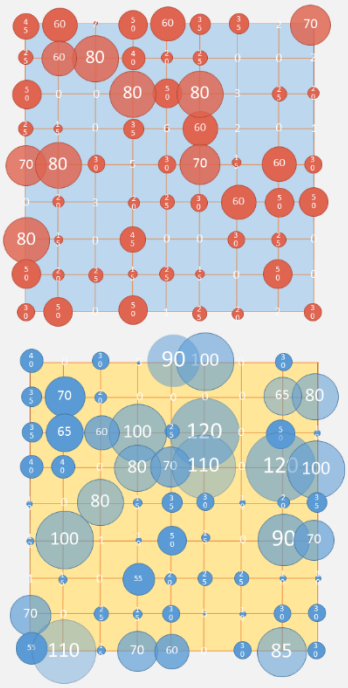

Figure 4: Fine-scale ant densities in two different 10 x10 m plots at Lyon Arboretum. Numbers indicate ant counts at peanut butter cards after 1 hr.

Conclusions:

- Although *S. papuana* sometimes co-occurred with other ants, it was by far the most prevalent ant on the ground in these mesic to wet forest locations.

- Densities of *S. papuana* can be very high, in some places nearly saturating soil and leaf litter microhabitats. This raises concern about its potential impacts.

Further Research:

- How widespread is *S. papuana* in the Koʻolau mountains?

- What are *S. papuana*'s ecological interactions in Oʻahu's native forests?

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