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| Title: Guam Forest Insect Survey | | | |
| Accession No. | 1005269 | Sponsoring Institution | National Institute of Food and Agriculture |
| Project No. | GUA0903 | Project Status | COMPLETE |
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| Submitted By | Adrian Ares | Date Submitted to NIFA | 03/11/2019 |

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Performing Organization/Institution

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Performing Department

Cooperative Extension Service

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{NO DATA ENTERED}

Collaborating Departments

{NO DATA ENTERED}

Collaborating/Partnering States

{NO DATA ENTERED}

Collaborating/Partnering Countries

{NO DATA ENTERED}

Collaborating/Partnering Organizations

{NO DATA ENTERED}

Non-Technical Summary

Despite the fact that Guam's forest ecosystems are rapidly being degraded by invasive insect species, such as the Asian cycad scale, *Aulacaspis yasumatsui*, the coconut rhinoceros beetle, *Oryctes rhinoceros*, and the little fire ant, *Wasmannia aurapunctata*, little is known about Guam's forest insects and their impacts on forest health. Discovery of three species of bark beetles not previously reported from Guam in a single trap at a single location [Moore, unpublished] illustrates this lack of knowledge. Support is requested for a Guam forest insect survey which will fill some of the gaps in our knowledge base.

Goals / Objectives

The objective of the proposed survey is to build a knowledgebase on insects associated with plants in Guam's forests. The survey will result in a reference collection of Guam's forest insects and a publicly available online database to facilitate sharing of specimen data, images and ecological associations among plants and insects. The knowledgebase will be useful to natural resource managers responsible for maintaining the health of Guam's forests and to biologists trying to understand Guam's terrestrial ecosystems in the wake of major biological invasions.

Methods

Sampling

The survey will extend beyond creating a species checklist. In addition to collecting and identifying insect specimens, associations among plants and other organisms will be recorded in a manner similar to what has been done for the pests of *Cycas micronesica* (Figure 1 in attached proposal). Insects associated with the 38 most abundant forest trees (Table 1) will be collected in collaboration with the Guam Department of Agriculture's Forestry Division. During the first year, insects associated with Guam's eight most predominant tree species will be surveyed (identified in the table as group 1 in attached proposal). Ten tree species will be surveyed in

each of the following three years (groups 2, 3, and 4 in attached proposal).

Insects associated with rare plants in Guam's forests will be surveyed in collaboration with the Guam Plant Extinction Prevention Program (GPEPP) [GPE, 2014]. Recently arrived insect species are undoubtedly putting these plants at an increased risk of extinction as illustrated by the recent discovery of a new armored scale insect attacking *Serianthes nelsonii* saplings [Moore et al., 2014].

A workshop on sampling methods will be offered to collaborators at the start of the project. Topics to be covered will include data requirements, photo-documentation, GPS, and rearing adults from field collected larvae. When possible, larval insects will be reared to the adult stage to facilitate identification and to collect parasitoids.

Taxonomy

The assistance of professional taxonomists will be required to accurately identify many of the insects collected by this survey. Project funding will be used to support an existing collaboration with Dr. Richard Zack, Director of the M. T. James Entomological Collection at Washington State University and also a director of the University of Guam Insect Collection. Project funds will be used for annual visits to Guam by Dr. Zack during which he will assist with and provide expert advice on collection, identification and curation of forest insect specimens in the UOG Insect Collection.

Voucher specimens will be kept in the University of Guam Insect Collection. The project will support a part-time collection technician.

Reporting

All project data will be stored in a modern, on-line, open-access biodiversity database. It is anticipated that several new island records, including some new invasive species, will be discovered during the survey. A Guam New Invasive Species Alert will be posted for each new invasive species and each new island record will be documented in a peer-reviewed scientific note.

Target Audience

All data collected by this project will be available to the public in a web site covering Guam's forest insects and their ecological associations. The target audience is the public at large, but the information will be most valuable to biologists and natural resources managers.

Products

The objective of the proposed survey is to build a knowledgebase on insects associated with plants in Guam's forests. The survey will result in a reference collection of Guam's forest insects and a publicly available online database to facilitate sharing of specimen data, images and ecological associations among plants and insects.

The knowledgebase will be useful to natural resource managers responsible for maintaining the health of Guam's forests and to biologists trying to understand Guam's terrestrial ecosystems in the wake of major biological invasions.

Expected Outcomes

The knowledgebase will be useful to natural resource managers responsible for maintaining the health of Guam's forests and to biologists trying to understand Guam's terrestrial ecosystems in the wake of major biological invasions.

Keywords

Guam, forestry, invasive species, native plants

Estimated Project FTEs For The Project Duration

| Role | Non-Students or Faculty | Students with Staffing Roles | | | Computed Total by Role |
|----------------|-------------------------|------------------------------|----------|----------------|------------------------|
| | | Undergraduate | Graduate | Post-Doctorate | |
| Scientist | 0.1 | 0.0 | 0.0 | 0.0 | 0.1 |
| Professional | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Technical | 0.0 | 0.3 | 0.0 | 0.0 | 0.3 |
| Administrative | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Other | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Computed Total | 0.1 | 0.3 | 0.0 | 0.0 | 0.4 |

Animal Health Component 0 %**Activities**

Research 50 %
Extension 25 %
Education 25 %

Research Effort Categories

Basic 50 %
Applied 50 %
Developmental 0 %

Classification

| Knowledge Area (KA) | Subject of Investigation (SOI) | Field of Science (FOS) | Percent |
|---------------------|--------------------------------|------------------------|---------|
| 211 | 640 | 1130 | 100 |

Knowledge Area

211 - Insects, Mites, and Other Arthropods Affecting Plants

Subject Of Investigation

0640 - Tropical forests

Field Of Science

1130 - Entomology and acarology

Assurance Statements

1. Are Human Subjects Involved? ☒ No ☐ Yes

If YES to Human Subjects

Is the Project Exempt from Federal regulations?

☐ Yes

If yes, select the appropriate exemption number.

☐ No

If no, is the IRB review Pending?

☐ Yes

☐ No IRB Approval Date

Human Subject Assurance Number

2. Are Vertebrate Animals Used? ☒ No ☐ Yes

If YES to Vertebrate Animals

Is the IACUC review Pending?

☐ Yes

☐ No IACUC Approval Date

Animal Welfare Assurance Number

Project Proposal:

| Filename | Size | Type |
|--------------------------|---------|-----------------|
| GuamForestPestSurvey.pdf | 2173266 | application/pdf |

Project Signature Panel

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Associate Director

UOG Station, CNAS

Assurance Statement Panel

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