Do birds control agricultural pests in the Marianas?

A Data Management Plan created using DMPTool

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Expected Data Type

Describe the type of data (e.g. digital, non-digital), how it will be generated, and whether the data are primary or metadata. Research examples include: lab work, field work and surveys; Education examples include: number of students enrolled/participated, degrees granted, curriculum, and training products; Extension examples include: outreach materials, number of stakeholders reached, number of activities, and assessment questionnaires.

The goal of this project is to determine whether birds are effective pest controllers on common agricultural crops in the Marianas. Effectiveness of pest control is assessed through plant health in the absence/present of birds. Plant health is determined by fruit yield, leaf damage by insect herbivory, and arthropod community. Measurements included: (1) insect presence, (2) spider presence, (3) % leaf area damaged from insect herbivory per plant (4) grams fruit yield per plant, and (5) above ground dry biomass of entire plant.

Insect presence

Pit fall traps were set on each of four rows in each treatment below the vegetation of the crop. Each plant species had two pitfall traps set on alternate sides in each treatment. Pitfall traps were collected in 24 hours and insects were identified to family in the lab.

Spider presence

Spiders were assessed through observational surveys. A coin was flipped to decide which treatment (open/exclosure) to survey first. For each plant species in the treatments, the number of spiders and webs on each plant were tallied and categorized into size classes (small =<1cm, medium=1-3cm, large=>3cm). Height, length, width, connections, and location of the web were also noted.

% leaf area damage from insect herbivory

Leaf damage was assessed by visually inspecting every third leaf from the base to apical meristem. The type of damage was recorded (rolled, deformity, discoloration, or galis) and damage was categorized by percent (0, 1-10, 10-25, 26-50, 51-75, 76-99, and 100% (leaf all gone)) based on reference cards for the species. Reference cards were generated by creating calibrated images for categories of damage. To do this, harvested leaves were scanned and the images were processed on ImageJ Software. In ImageJ, the whole leaf and the holes on the leaf were measured.

Grams fruit yield per plant

Fruits were harvested and taken back to the lab. Fruit health was assessed both quantitiatively and qualitatively. Quantitative assessment involved taking wet and dry weights of the fruits to the nearest gram. Qualitative assessment involved ranking the quality of fruit as follows:

(i) Mature (Rank Quality 1-5)

1. Poor Fruit: >7% damage(herbivory, deformation, discoloration)
2. Below Average Fruit: 3-7% damage(herbivory, deformation, discoloration)
3. Average Fruit: 1-3% damage(herbivory, deformation, discoloration)
4. Good Fruit: .5-1% damage(herbivory, deformation, discoloration)
5. Excellent Fruit: <.5% damage(herbivory, deformation, discoloration)

(ii) Aged or rotten fruit (cannot assess damage)

1. Rotten
2. Aged

(iii) Juvenile (no resale value)

1. Long Beans <25cm
2. Eggplant <10cm

Data Format

For scientific data to be readily accessible and usable it is critical to use an appropriate community-recognized standard and machine readable formats when they exist. If the data will be managed in domain-specific workspaces or submitted to public databases, indicate that their required formats will be followed. Regardless of the format used, the data set must contain enough information to allow independent use (understand, validate and use) of the data.

Data were collected on printed data sheets both in the field and the lab. Data sheets were then scanned and inputted into Microsoft Excel spreadsheets.

Data Storage and Preservation

Data must be stored in a safe environment with adequate measures taken for its long-term preservation. Applicants must describe plans for storing and preserving their data during and after the project and specify the data repositories, if they exist. Databases or data repositories for long-term preservation may be the same that are used to provide Data Sharing and Public Access. Estimate how much data will be preserved and state the planned retention period. Include any strategies, tools, and contingency plans that will be used to avoid data loss, degradation, or damage.

Original data sheets are stored in a data repository in the Rogers Lab at Iowa State University. Data sheets were scanned and data were inputted into Microsoft Excel Spreadsheet. Data were saved in both .xls and .csv formatting. The scans and spreadsheets in both formats will remain indefinitely in a long-term repository on Box. All data wrangling and analyses will be done using R Software. Version control will be applied using Git and GitHub.

Data Sharing and Public Access

Describe your data access and sharing procedures during and after the grant. Name specific repositories and catalogs as appropriate. include a statement, when applicable, of plans to protect confidentiality, personal privacy, proprietary interests, business confidential information, and intellectual property rights. Outline any restrictions such as copyright, confidentiality, patent, appropriate credit, disclaimers, or conditions for use of the data by other parties.

A public presentation of the results will be given on each island, and a report will be sent to each of the farmers and other collaborators that supported the research. The results of will also be made available to the public in any published papers based off of the research. The raw data itself will be available upon request with approval of Dr. Haldre Rogers (the PI of the project). Code used to process and analyze the data may also be made available after the publication of papers based on this project.

Roles and Responsibilities

Who will ensure DMP implementation? This is particularly important for multi-investigator and multi-institutional projects. Provide a contingency plan in case key personnel leave the project. Also, what resources will be needed for the DMP? If funds are needed, have they been added to the budget request and budget narrative? Projects must budget sufficient resources to develop and implement the proposed DMP.

DMP implementation will be ensured by the principle investigator, Haldre S. Rogers, and the working team with designated tasks. Some task designation is as follows:

- Data collection and production of materials: Data were collected in Summer 2010 by the Ecology of Bird Loss team headed by Dr. Haldre S. Rogers. Analyses of the data and product generation will be completed by Jerilyn Calaor, Haldre S. Rogers, and other possible co-authors who have helped with the project in 2010.
- Data preservation and storage: Data was scanned and entered by the collector promptly after collection. Hard copies of data sheets are to be stored in the data repository in the Rogers Lab at Iowa State University. Scanned and digital copies (.xls and .csv) are to be stored in Box indefinitely.

Clear and thorough notes are to be kept by each individual on the project at every stage of the process. Such notes must be accessible by all members on the team and left with the lab in the event that the personnel leave the project.

Funds needed to implement this DMP have been provided through a grant from the US Department of Agriculture National Research Initiative.

Monitoring and Reporting

Successful projects should monitor the implementation of the DMP throughout the life of the project and after, as appropriate. Implementation of the DMP must be a component of annual and final reports to NIFA (REEport) and include progress in data sharing (publications, database, software, curriculum, outreach materials, etc.). The final report should also describe the data that was produced during the award period and the components that will be stored and preserved (including the expected duration) after the award ends. The DMP should be compliant with the Research Terms and Conditions that govern NIFA-funded project. The DMP is not intended to be a replacement for other grant reporting requirements.

During the project, meetings with farmers and other collaborators were held. At the end of our experiment, we gave a public presentation on each island and sent a report to each of the farmers and other collaborators that supported our research. All necessary annual and final reports during the duration of funding were also submitted.