(1) Hosts and management of lobate lac scale, *Paratachardina pseudolobata* Kundo and Gullan, in Hawaii’s urban landscape. Bishnu Prasad Bhandari* and Zhiqiang Cheng Department of Plant and Environmental Protection Sciences, University of Hawaii at Mānoa.

The lobate lac scale (*Paratachardina pseudolobata* Kundo and Gullan) is a recent insect invader in Hawaii, which usually infests young branches of woody plants (<2 cm in diameter). It forms a mass that appears as a dark crust, resulting in an unhealthy appearance, subsequent plant defoliation and eventually, death in some plants. Infestations on Oahu have occurred and are continually spreading in many native and non-native plants. A visual survey of lobate lac scale’s host plants on Oahu’s urban landscape was conducted. Efficacy and longevity of systemic insecticide trunk injections against lobate lac scale were also evaluated on banyan trees. Imidacloprid and emamectin benzoate were tested as a preventive treatment on 45 Chinese banyans (*Ficus microcarpa*) while imidacloprid was evaluated as a curative treatment on ten weeping banyans (*Ficus benjamina*). Our survey documented 111 host plant species of lobate lac scale in urban Oahu. Imidacloprid as a preventive treatment was very effective with at least 22 months of control. Curative treatment with imidacloprid reduced infestations for at least 20 months. This research provided a critical update on the lobate lac scale’s host species in Hawaii. It also demonstrated a very effective preventive and curative management strategy against this pest.

(2) Testing the utility of intergenic spacer regions to identify distinct *Plumeria* taxa. Kauahi Perez*, Department of Tropical Plant and Soil Sciences, University of Hawaii at Mānoa

In Hawaii, *Plumeria* cultivars contribute to the floriculture, landscape, and tourist industries due to their ease of growth and variety of colors and fragrances. However, many cultivars suffer from fungal, insect, and viral pests, which lowers flower yields and renders plants unmarketable or unfit for export. Breeding these cultivars with *Plumeria* species (spp.) that have resistance traits will help to overcome these problems, while creating new plumeria cultivars. DNA analyses can identify distinct *Plumeria* spp. that are more closely related to certain cultivars. These *Plumeria* spp. can then be used to introduce new horticultural traits into their related cultivars. Six DNA regions were tested for
their ability to discriminate between five distinct *Plumeria* spp. and reveal genetic relationships. Two DNA regions were successful at discriminating between *Plumeria* spp., and both revealed similar genetic relationships. Combining these two regions validated the genetic relationships revealed from analyses of the two individual regions, but with higher certainty. In conclusion, these two DNA regions can now be used to identify *Plumeria* spp. that are more closely related to certain cultivars. These *Plumeria* spp. can then be used to introduce horticulturally important traits into their related cultivars to create new plants for the floriculture industry.

(3) Tracking the performance of Herbicide Ballistic Technology (HBT) for improved invasive species management. Roberto Rodriguez III*, Daniel Jenkins and James J.K. Leary, Department of Molecular Biosciences and Bioengineering, Department of Natural Resources and Environmental Management, University of Hawaii at Mānoa

Since 2012, the Herbicide Ballistic Technology (HBT) platform has been deployed in helicopter operations to eliminate new populations of the invasive plant species Miconia (*Miconia calvescens*) spreading across the East Maui Watershed. The HBT platform is a refined pesticide application system that delivers small amounts of herbicide enclosed in paintballs from long range (~30m) and varying altitude. This onboard system provides accurate, effective treatment of individual plant targets occupying remote, inaccessible portions of the forested landscape. We have developed an automated data collection system for HBT applications. This system records time, location, and other data for every treatment. With target assignments for each paintball, the HBT-TS records exact herbicide dosage applied to each target. By tracking the orientation of the marker and distance to the target, we are able to calculate the plant location relative to the applicator position and provide operational statistics of herbicide use rate (grams acid equivalent ha⁻¹) based on the known amount of herbicide contained in each paintball and the final placement on the landscape. This data is used to provide important information relevant to landscape scale invasive species management.