RESULTS OF AN INVESTIGATION OF SEED GERMINATION FROM FRESH VERSUS SENESCING DELISSEA WAIANAEENSIS FRUIT

INTRODUCTION

Data indicate that seed viability declines as Cyanea superba subsp. superba fruit senesce (desiccate and/or decompose), suggesting potential dispersal limitation (OANRP 2015, OANRP 2016). It was hypothesized that similar losses in seed viability associated with fruit senescence may occur in other fleshy-fruited Lobelioids, including Delissea waianaeensis. Fruits of these species have characteristics suggestive of bird dispersal, though native dispersers no longer occur, and non-harvested fruits of both species begin to decompose prior to falling off the plant. A laboratory trial was conducted by the Oahu Army Natural Resources Program (OANRP) to examine seed viability in fresh versus senesced D. waianaeensis fruit.

METHODS

Collections of fresh and senesced D. waianaeensis fruits were made on June 14, 2016 at an outplanted population at Kaluaa and Waieli Management Unit (KAL-C) (Figure 1). A single fruit was collected from fifteen individual plants for each treatment (Figure 2). All fruits were collected directly from plants (not from the ground). The senesced fruits were of unknown age. Seeds were extracted from fruits and sown at the OANRP seed laboratory on June 15, 2016. Twenty-five seeds per fruit were sown on agar in petri dishes. Petri dishes were stored in a Percival Controlled Environment Chamber (with diurnal light and temperature settings matching average monthly temperatures for the Nike missile installation at Pahole, at approximately 2100 feet elevation as a best approximation for conditions at the reintroduction site), and examined weekly for germination for a total of 15 weeks. Germination rates were compared using a t-test in IBM SPSS Version 24. Excess seeds from collected fruit (an estimated 2408 seeds from fresh fruit, and 1867 from senesced fruit) were dried at 33% relative humidity (RH) at 24 C for one month and stored at 20% RH and 4 C at the OANRP seed laboratory for seed storage longevity testing, the results of which will be reported upon at a future date.

Map removed to protect rare resources

Figure 1. Location of Delissea waianaeensis fruit collection at Kaluaa and Waieli Management Unit.
RESULTS

Seeds began germinating by three weeks. Peak germination (highest number of seeds germinating at any one time) occurred around four weeks. There was no germination after eight weeks. Mean germination rates were similarly and consistently high both for seeds from fresh (95.7%, SE 1.43) as well as senesced (94.1%, SE 2.43) fruit (t-test: T = 0.576, df = 28, p = 0.576) (Figure 3).

DISCUSSION

As germination rates remained high in senescing *D. waianaeensis* fruit, seeds from fruits not removed by frugivores retain the potential to germinate. However, the length of time non-harvested fruits remain on plants, seed viability upon abscission, and seed viability over time in undispersed fruit that has fallen to the ground remain unexplored.

REFERENCES
