

Fountain grass impacts on ‘āweoweo
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Introduction

The Koai‘a Tree Sanctuary is a nature preserve in the South Kohala district of Hawai‘i Island, helping to preserve rapidly disappearing native plants. What had been 162 square km (40,000 acres) of pristine native forest was grazed down by cattle to approximately 0.05 square km (13 acres) (Jensen, Chelsea). The sanctuary is at an elevation 945 m (3,100 ft), receiving approximately 0.56 m (22 in) of rainfall a year.

Fountain Grass (*Pennisetum setaceum*) (Figure 1), an invasive plant in Hawai‘i, is prevalent in the Koai‘a Tree Sanctuary and has taken over most of the leeward side of Hawai‘i Island. It poses many threats to Hawai‘i Island's native ecosystems. It invades dry forests, growing rapidly, changing structure of the forest and outcompeting indigenous plants for resources. It is a major fire threat and invades bare lava flows, disrupting native primary succession (Tunison). It has even been hypothesized to be allelopathic (toxic) to nearby native species (Melora Purell, pers comm).

‘Āweoweo (*Chenopodium oahuense*) (Figure 2) is a native shrub found in the Koai‘a Tree Sanctuary which can reach 5-20 m in height. It is the endemic to Hawai‘i and is considered an ecosystem restoration plant. It enhances



Figure 1. Dead fountain grass (*Pennisetum setaceum*)



Figure 2. ‘Āweoweo (*Chenopodium oahuense*)

diversity in forest communities and helps to control erosion. Adapted to habitats of coastal and dry forests, there are no known pests detrimental to its life cycle (Duvachelle)

We asked the question, how does the growth of the fountain grass impact the abundance of the native shrub 'āweoweo? We hypothesized that the fountain grass would negatively impact the growth of the 'āweoweo and that, with higher amounts of fountain grass, there would lower amounts of 'āweoweo.

Materials

- Clipboards, data table, pencil
- Tape Measure

Methods

A tape measure was used as a transect line through the Koai'a Tree Sanctuary. Plots along the transect line were 60m long and 6m wide (360 square meters). The number of fountain grass and 'āweoweo plants were counted in each of 6 plots. Data were tabulated and analyzed for correlations.

Results

Table 1. Number of 'āweoweo shrubs and fountain grass plants in each plot

Plot #	# of Fountain Grass	# of 'Āweoweo
Plot 6	125	3
Plot 5	125	16
Plot 3	150	15
Plot 1	192	21
Plot 4	195	29
Plot 2	265	25

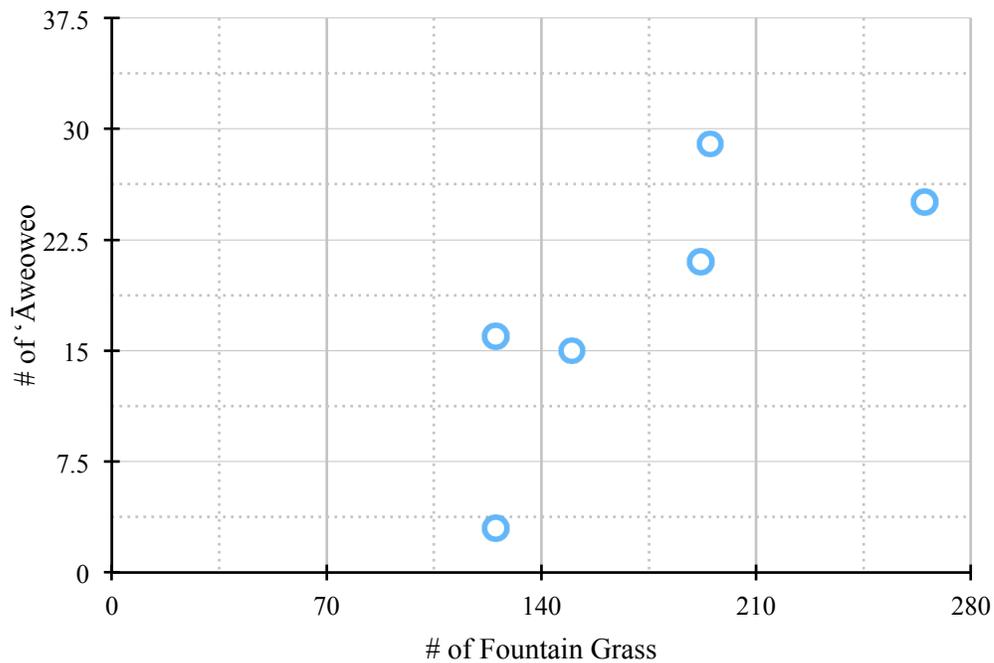


Figure 3. Number of 'āweoweo plants in relation to the number of fountain grass plants in each plot

Table 1 and Figure 3 show that, while the fountain grass tended to greatly outnumber ‘āweoweo (the greatest number of fountain grass in a plot was 265, while the greatest number of ‘āweoweo was 29), there was a positive correlation between the number of fountain grass and ‘āweoweo shrubs. More fountain grass plants correlated with more ‘āweoweo.

Conclusion

The abundance of fountain grass positively correlated with the growth of the native plant ‘āweoweo in this study. The hypothesis tested was not supported by these data. We had hypothesized a negative correlation. Surprisingly, the ‘āweoweo seemingly thrived where the fountain grass thrived. These results were unexpected. We recommend future studies investigating how the ‘āweoweo was able to coexist in the presence of the fountain grass. Work towards eradicating fountain grass and management and research at the Koai‘a Tree Sanctuary may benefit by further studies into the hardiness of the ‘āweoweo and its biogeographical benefits.

Work Cited

- "Fountain Grass." Hawaii Invasive Species Council Fountain Grass Comments. 21 Feb. 2013. Web. 18 Apr. 2016.
- Tunison, Timothy J. "Fountain Grass (Pennisetum Setaceum) Info Excerpt." Fountain Grass (Pennisetum Setaceum) Info Excerpt. Web. 18 Apr. 2016.
- Jensen, Chelsea. "Restoring Kohala." Restoring Kohala. West Hawaii Today, 28 Oct. 2012. Web. 18 Apr. 2016.
- Duvachelle D. "Aweoweo *Chenopodium oahuense* (Meyen) Aellen." NCRS. Plant Fact Sheet. November 2009. Web. April 18, 2016